

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

**NPDES Permit No. MD0068322
State Discharge Permit No. 11-DP-3318**

ANNUAL UPDATE NUMBER 21

Submitted to:

**State of Maryland
Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230**

Submitted by:

**Department of Public Works
Howard County Government
Stormwater Management Division
6751 Gateway Drive, Suite 514
Columbia, Maryland 21046**

December 19, 2016

This page is intentionally blank.

Table of Contents

Section I. Introduction

- A. Background
- B. Howard County, Maryland
- C. Annual Update Number 21

Section II. Standard Permit Conditions

- A. Permit Administration
- B. Legal Authority
- C. Source Identification
- D. Management Programs
- E. Restoration Plans and Total Maximum Daily Loads
- F. Assessment of Controls
- G. Program Funding

Section III. Program Review and Annual Progress Reporting

- A. Annual Reporting

Section IV. Special Programmatic Conditions

- A. Chesapeake Bay Restoration by 2025
- B. Comprehensive Planning

References

List of Tables

Table 1: Construction Inspections

Table 2: Preventative Maintenance Inspections

Table 3: FY16 Adopt-A-Road Summary

Table 4: Howard County Vehicle Wash Pad/Rainwater Harvesting Sites

Table 5: Pollutant Load Reductions and Impervious Credit

Table 6: Impervious Area Assessment Summary in Acres

Table 7: Impervious Area Restoration Progress Summary in Acres

Table 8: Howard County Local TMDL Summary

Table 9: CIS Planned Strategies

Table 10: SW-WLA Planned Reductions Summary

Table 11: Fiscal Year Schedule of Project Implementation and Cost

Table 12: Little Patuxent River and Middle Patuxent River Watershed Assessment Public Meeting Schedule

Table 13: Mainstem Patuxent River and Patapsco River Watershed Assessment Public Meeting Schedule

Table 14: SW-WLA Progress Reductions as of 2016

Table 15: Fiscal Year Schedule of Project Implementation Cost

Table 16: Cost Estimate Summary Per Watershed

Table 17: Narrative Files

List of Figures

Figure 1 – Implementation Schedule with End Dates Indicated

Section I. Introduction

A. Background

Since passage of the Federal Water Pollution Control Act Amendments of 1972, subsequent amendments have increasingly emphasized the quality control of stormwater runoff. The most recent revision, the Water Quality Act of 1987, establishes permit requirements for both Municipal Separate Storm Sewer Systems (MS4s) and stormwater discharges associated with industrial discharges. Section 402(p) of the Act requires phased permit applications, compliance requirements, and deadlines for application submission and approval.

On November 16, 1990, the final National Pollutant Discharge Elimination System (NPDES) Permit Application Regulations for Storm Water Discharges were published in the *Federal Register*. The Regulations establish permit conditions for large (serving populations greater than 250,000) and medium (serving populations greater than 100,000 but less than 250,000) MS4s. Included are requirements to effectively prohibit non-stormwater discharges into storm sewers and controls to reduce the discharge of pollutants to the maximum extent practicable. The Regulations also require NPDES permits for stormwater discharges associated with certain industrial activities.

The U.S. Environmental Protection Agency (USEPA) has delegated review and permitting authority for Maryland's large and medium municipalities to the Maryland Department of the Environment (MDE). Within the MDE, the Water Management Administration (WMA) is responsible for issuing permits to designated municipalities.

B. Howard County, Maryland

Howard County referred to as "the County", with population of 309,284 according to the Howard County Department of Planning and Zoning (DPZ) September 2016 population data, is one of five medium and five large jurisdictions in Maryland that is regulated by a MS4 Permit. Additionally, the Maryland State Highway Administration also is under permit. Howard County's first permit, (MS-HO-95-008, which was subsequently renumbered to MD0068322, 99-DP-3318), went into effect on April 17, 1995 and expired on April 17, 2000. During this period, Howard County undertook an extensive effort to improve Maryland's water quality and became a state and national leader in the control of stormwater. Howard County's second permit, (Number MD0068322, 00-DP-3318), went into effect on June 15, 2000 and expired on June 15, 2005. This permit included conditions that reflected Howard County's progress toward stormwater management (SWM) program implementation under its NPDES MS4 permit. The County's third permit (Number MD0068322, 00-DP-3318), which went into effect on June 20, 2005 was to expire on June 20, 2010, but due to a delay in the issuance of the County's fourth permit, the County continued to operate under its third permit per MDE until December 18, 2014 when the fourth permit was issued. The conditions of the fourth permit (Number MD0068322, 11-DP-3318), are similar to previous permits. As required by the conditions of the permit, the County must prepare Annual Updates to report on the progress made during the preceding permit year.

C. Annual Update Number 21

For Annual Update Number 20 (AR20), MDE required breaking out two six-month permit periods to report on permit compliance under the County's third and fourth permits. Therefore, this Annual

Update Number 21 (AR21) is the first to report on a full year under the County's fourth NPDES MS4 Permit. Information is presented in the following parts and sections:

Section I. Introduction

Section II. Standard Permit Conditions

Section III. Program Review and Annual Progress Reporting

Section IV. Special Programmatic Conditions

Each section generally begins with the permit conditions, which are denoted in bold italics. Following each permit condition, as applicable, is a description of the progress made towards meeting the permit conditions within the annual update reporting year. Annual data are compiled/reported on a fiscal year basis.

Section II. Standard Permit Conditions

A. Permit Administration

Howard County shall designate an individual to act as a liaison with the Maryland Department of the Environment (MDE) for the implementation of this permit. The County shall provide the coordinator's name, title, address, phone number, and email address. Additionally, the County shall, in its annual reports, submit to MDE an organizational chart detailing personnel and groups responsible for major NPDES program tasks in this permit. MDE shall be notified of any changes in personnel or organization relative to NPDES program tasks.

Annual Update Number 21 Status

The County has included the current organizational information as a narrative file included in the geodatabase. Mr. Mark S. Richmond, Chief of the SWMD, is the liaison with MDE and can be reached at (410) 313-6413 or msrichmond@howardcountymd.gov.

B. Legal Authority

Howard County shall maintain adequate legal authority in accordance with NPDES regulations 40 CFR Part 122.26 throughout the term of this permit. In the event that any provision of its legal authority is found to be invalid, the County shall notify MDE within 30 days and make the necessary changes to maintain adequate legal authority. All changes shall be included in the County's annual report.

Annual Update Number 21 Status

The County previously submitted a certification from the County Attorney to MDE, which stated that the County possesses the authority to directly perform the activities described in 40 CFR 122.26(d)(2)(i) and the NPDES permit. Specifically, the County Office of Law has certified that the laws of Howard County, Maryland provide adequate legal authority to carry out Howard County's NPDES Permit for Operators of MS4 programs. The legal authority is adequate to implement programs that control the quality as well as the quantity of water that is discharged through its storm sewer system.

C. Source Identification

Sources of pollutants in stormwater runoff countywide shall be identified and linked to specific water quality impacts on a watershed basis. The source identification process shall be used to develop watershed restoration plans. The following information shall be submitted annually for all County watersheds within the permit area in geographic information system (GIS) format with associated tables as required in PART V of this permit:

- 1. Storm drain system: all infrastructure, major outfalls, inlets, and associated drainage areas delineated;*
- 2. Industrial and commercial sources: industrial and commercial land uses and sites that the County has determined have the potential to contribute significant pollutants;*
- 3. Urban best management practices (BMPs): stormwater management facility data including outfall locations and delineated drainage areas;*

4. ***Impervious surfaces: public and private land use delineated, controlled and uncontrolled impervious areas based on, at a minimum, Maryland's hierarchical eight-digit sub-basins;***
5. ***Monitoring locations: locations established for chemical, biological, and physical monitoring of watershed restoration efforts and the 2000 Maryland Stormwater Design Manual; and***
6. ***Water quality improvement projects: projects proposed, under construction, and completed with associated drainage areas delineated.***

Annual Update Number 21 Status

Updated versions of the County's Source Identification GIS data (items 1. – 6. above) are provided on the DVD included in Section IV of this Annual Update. Several items related to Source Identification are noted below:

Storm Drain System

As of June 30, 2016 there are 7,272 outfall records included in the Outfall feature class of the MDE NPDES Geodatabase. There are currently 393 outfalls that meet the requirements of being major MS4 outfalls. Each of the 393 major MS4 outfalls has a corresponding drainage area in the OutfallDrainageArea feature class. The County is currently developing a method for prioritizing the delineation of drainage areas for non-major outfalls. Other County GIS storm drain system layers are also included with the data submittal including outlets, inlets, stormdrains and manholes.

The permit requires that drainage areas be delineated to all BMPs in the County. A total of 2,259 delineated drainage areas are now in the County's GIS, which is being submitted as the BMPDrainageAreas feature class in MDE's NPDES Geodatabase. The difference between the total number of BMPs and the number of BMP drainage areas is attributable to BMPs such as dry wells, and other small single lot LID practices, where it is impractical to delineate a drainage area to such a localized BMP. At present the County has no plans for delineating drainage areas to each of these individual lot BMPs, but these BMPs are factored into the pollutant removal computations discussed later in this Annual Update. A total of 6018 drainage areas (2,259 delineated and 3,759 assumed) are in the pollutant loading model and they correspond to records in the RestBMP and BMPPOI feature classes. Per MDE's database requirements, records stored in the AltBMPLine, AltBMPPoint, and AltBMPPolygon feature classes do not have a corresponding drainage area.

Industrial and Commercial Sources

Howard County obtained SDAT data which identified approximately 2500 commercial and industrial parcels in the county. All commercial and industrial parcels were then entered into the Commercial/Industrial CRM database. The County set a goal of conducting a visual survey of 500 sites each year in order to perform a visual survey on each site within the five year permit term. In FY16, 611 sites were surveyed. The surveys are conducted by the four inspectors in the Stormwater Management Division who also inspect stormwater management facilities and perform illicit discharge field investigations. During the survey, the inspectors photograph each site, and if they find a suspected discharge they try to determine the source. Back in the office they complete a Field Data Sheet and enter the site information, photos, and scanned Field Data Sheet into the Commercial/Industrial CRM database. Any suspected discharges are referred to the County's IDDE Team Leader and the corresponding Field Data Sheet and photos are saved into the SWMD's shared drive. The IDDE Team Leader then follows up on and resolves the suspected discharge. GIS data representing the potential industrial and commercial sources and the FY16 assessed sites is included as a separate GIS layer.

Urban Best Management Practices (BMPs)

For Annual Report Number 21, the County has migrated from the Attachment A, Table B format used for Annual Report Number 20 into MDE's new NPDES Geodatabase version 1.1. Urban BMP data are now split across multiple feature classes and tables in the geodatabase including BMPPOI, BMP, AltBMPLine, AltBMPPoly, BMPInspections, AltBMPLineInspections, AltBMPPolyInspections, RestBMP, and RestBMPInspections. These feature classes and tables encompass both development BMPs, restoration projects, and alternative BMPs. For the purposes of annual reporting this urban BMP summary will include the BMPPOI, BMP and BMPInspection tables and the other data is described below under Water Quality Improvement Projects; however in reality there is much overlap between the two sections.

The BMPPOI, BMP, and BMPInspections tables each contain 5,712 records, which is an increase of 741 records from AR20. The County is currently evaluating how to best implement the new BMP point of interest (POI) protocol. For now all BMP records in the BMP table have a corresponding BMP POI record. The inspection information provided in the BMPInspections table is current as of December 2016. As a result, 507 records have a LAST_INSP_DATE after the June 30, 2016 end date of the reporting period. Inspections for 883 facilities have not been performed within three years of the June 30, 2016 end date of the reporting period. Most of these facilities are individual residential lot BMPs for which the County has started performing systems inspections. In FY16, the County developed and piloted an approach to inspecting these BMPs and began actively implementing the process. Notes were added to the GEN_COMMENTS field indicating the reason for the lack of inspection and the time frame for when the inspection will be complete. All inspections for the individual residential lot BMPs will be complete by December 2018. The REINSP_DATE field of the BMPInspections table does not allow for null values, so a default value of 12:00AM was assigned when no re-inspection was performed.

Impervious Surfaces

The County has updated its impervious accounting in the past year as part of the baseline impervious surface area assessment to provide the baseline untreated value and the associated 20% restoration target. The assessment was first detailed in the County's Countywide Implementation Strategy submitted to MDE with AR20 in December of 2015. Updates to the accounting are based on MDE comments on the 2015 version and the MDE recommended change in the cutoff date between baseline and restoration to be coincident with the end of the County's last permit, June 20, 2010. The assessment procedure and results are summarized in this Annual Update in under permit condition IV.E.2 and detailed in an attached narrative file (Howard County Impervious Accounting 20161219).

In preparation of the base GIS layer used in the analysis, the County's jurisdictional impervious areas were delineated via an extraction of areas under other ownership including State Owned Properties such as State Highway Administration and the Department of Natural Resources. Properties under separate Industrial NPDES permits were also excluded. A list of properties with associated impervious acreage deducted from the County's baseline is included in the narrative files of the geodatabase (Howard County Impervious Accounting 20161219).

The County's impervious GIS layer has been submitted separately along with the NPDES Geodatabase since it is not specifically required of the database schema. The County has submitted the 2002 GIS layer delineated by ownership and by 8-digit watershed to demonstrate the 2002 baseline condition used in the impervious accounting analysis.

Monitoring Locations

The County's NPDES monitoring locations and associated drainage areas are included in the database in the MonitoringSite feature class. Monitoring locations include both the biological and chemical monitoring sites for the Wilde Lake subwatershed monitoring and the Red Hill Branch subwatershed monitoring conducted in fulfillment of Part IV.F.1 Watershed Restoration Assessment.

Part IV.F.2 Stormwater Management Assessment is being conducted at the Rumsey Run project site. Locations of the geomorphic monitoring locations are included with the data submittal as a separate GIS layer.

Howard County conducts monitoring several other sites beyond what the NPDES permit requires. These sites include the Turf Valley and Dorsey Hall monitoring studies which are further described under permit condition IV.F.1 of the annual report. Monitoring site locations for these sites are included in the MonitoringSite feature class of the geodatabase.

Water Quality Improvement Projects

Water quality improvement projects which were previously stored in Attachment A, Table D of Annual Report Number 20 are now stored in several features and tables including RestBMP, AltBMPLine, AltBMPPoly, AltBMPPoint and their associated Inspection tables of the new MDE NPDES Geodatabase. For this database, the County is using the expiration of our 3rd generation permit date of June 20, 2010 as the cutoff between projects associated with the old, versus the current permit; however all improvement projects are included in the dataset.

The RestBMP feature class contains 311 records, with 310 completed and one record in construction. Each RestBMP record has a corresponding inspection record in the RestBMPInspections table. All but four inspections were performed within three years of the June 30, 2016 end date of the reporting period. These inspections will be completed in FY17 and included in AR22. The REINSP_DATE field of the RestBMPInspections table does not allow for null values, so a default value of 12:00AM was assigned when no re-inspection was performed. 306 of the RestBMP records have a corresponding drainage area in the BMPDrainageArea feature class. For the four records without a corresponding drainage area, impervious treatment information was provided by the designer. Drainage areas will be delineated in FY17 and included in AR22.

The AltBMPLine feature class contains 92 records with 55 stream restorations and 37 outfall stabilizations, which is an increase from the 43 stream restoration records included in Table B of AR20. The addition of the outfall stabilization records was a result of a cleanup effort the County implemented to identify outfall stabilizations completed as part of stream restoration or other restoration projects. The IMPL_STATUS field is populated with the current status as of December 2016 with 72 of these records being complete, 19 in planning, and 1 in construction. An inspection record for each of the 72 completed projects is included in the AltBMPLineInspections table. All inspections have been performed within three years of the June 30, 2016 end date of the reporting period. The REINSP_DATE field of the AltBMPLineInspections table does not allow for null values, so a default value of 12:00AM was assigned when no re-inspection was performed.

The AltBMPPoly feature class contains 2,570 records with 2,569 tree plantings and one street sweeping record, which is an increase from the 340 tree planting records included in Table B of AR20. The large increase in tree planting records is due to removing the minimum acreage for inclusion in the database. For AR20, only tree plantings greater than a quarter acre were included. Each AltBMPPoly record has a

corresponding inspection record in the AltBMPPolyInspections table. All but six inspections were performed within three years of the June 30, 2016 end date of the reporting period. These inspections will be completed in FY17 and included in AR22. The REINSP_DATE field of the AltBMPPolyInspections table does not allow for null values, so a default value of 12:00AM was assigned when no re-inspection was performed.

The AltBMPPoint feature class includes 174 total records including 6 septic connections to public wastewater systems and 168 septic system upgrades to denitrification systems dating back to 2011. Although septic reductions for these projects are calculated and reported, it is the County's current understanding that reductions achieved from septic practices may not be credited towards the urban MS4 sector and only impervious credits associated with septic systems can be used.

D. Management Programs

The following management programs shall be implemented in areas served by Howard County's MS4. These management programs are designed to control stormwater discharges to the maximum extent practicable (MEP) and shall be maintained for the term of this permit. Additionally, these programs shall be integrated with other permit requirements to promote a comprehensive adaptive approach toward solving water quality problems. The County shall modify these programs according to needed program improvements identified as a result of periodic evaluations by MDE.

1. Stormwater Management

An acceptable stormwater management program shall continue to be maintained in accordance with the Environment Article, Title 4, Subtitle 2, Annotated Code of Maryland. Activities to be undertaken by the County shall include, but not be limited to:

- a. Implementing the stormwater management design policies, principles, methods, and practices found in the latest version of the 2000 Maryland Stormwater Design Manual. This includes:*
 - i. Complying with the Stormwater Management Act of 2007 (Act) by implementing environmental site design (ESD) to the MEP for new and redevelopment projects;*
 - ii. Tracking the progress toward satisfying the requirements of the Act and identifying and reporting annually the problems and modifications necessary to implement ESD to the MEP; and*
 - iii. Reporting annually the modifications that have been made or need to be made to all ordinances, regulations, and new development plan review and approval processes to comply with the requirements of the Act.*
- b. Maintaining programmatic and implementation information including, but not limited to:*
 - i. Number of Concept, Site Development, and Final plans received. Plans that are re-submitted as a result of a revision or in response to comments should not be considered as a separate project;*
 - ii. Number of redevelopment projects received;*

- iii. *Number of stormwater exemptions issued; and*
- iv. *Number and type of waivers received and issued, including those for quantity control, quality control, or both. Multiple requests for waivers may be received for a single project and each should be counted separately, whether part of the same project or plan. The total number of waivers requested and granted for qualitative and quantitative control shall be documented.*

Stormwater program data shall be recorded on MDE's annual report database and submitted as required in PART V of this permit.

- c. *Maintaining construction inspection information according to COMAR 26.17.02 for all ESD treatment practices and structural stormwater management facilities including the number of inspections conducted and violation notices issued by Howard County.*
- d. *Conducting preventative maintenance inspections, according to COMAR 26.17.02, of all ESD treatment systems and structural stormwater management facilities at least on a triennial basis. Documentation identifying the ESD systems and structural stormwater management facilities inspected, the number of maintenance inspections, follow-up inspections, the enforcement actions used to ensure compliance, the maintenance inspection schedules, and any other relevant information shall be submitted in the County's annual reports.*

Annual Update Number 21 Status

Stormwater Management Act Compliance

The County continues to comply with the Act and implement ESD to the MEP for new and redevelopment projects under the current version of the Design Manual, including the 2009 revision for ESD, as well as provide feedback on that version, as necessary. The County has had no modifications to the design manual requirements and there are no programmatic problems to address at this time.

Stormwater Management Programmatic and Implementation Information

Stormwater management is reviewed for compliance with the Howard County Design Manual, Volume I – Storm Drainage, throughout the development process by Planning and Zoning – Development Engineering Division. The programmatic and implementation information identified as i. – iv. above has been included in this Annual Update in the database under Stormwater Management as required by Part V of the County's MS4 Permit.

Construction Inspection

Stormwater construction inspections are the responsibility of Public Works – Construction Inspection Division. A summary of the stormwater construction inspections and violation notices issued is listed in Table 1 and is listed in the SWM Associated Table in the geodatabase.

Table 1: Construction Inspections

Summary of Inspections and Violations	Total July 1, 2015 – June 30, 2016
Number of Construction Inspections	9,993
Number of Construction Violations	1,326

Preventative Maintenance Inspections

The SWMD is responsible for SWM BMP inspections, which continue to be performed for County, Board of Education, and private SWM facilities on a triennial basis. A summary of the inspections from July 1, 2015 through June 30, 2016 is listed in Table 2.

There are currently 1,216 County maintained BMPs, 143 Board of Education BMPs, and 2,223 privately owned and maintained BMPs, for a total of 4,969 BMPs, which are inspected on a three-year cycle.

Table 2: Preventative Maintenance Inspections

Inspection Detail	Inspections July 1, 2015 - June 30, 2016
Maintenance Inspections	
County Maintained BMPs	407
Board of Education Maintained BMPs	50
Privately Maintained BMPs	640
Residential ESD BMPs	632
Follow-up Inspections	356
Enforcement Actions	0 Citation / (13) NOVs
Total	2,098

** The inspection cycle for Board of Education Maintained BMPs begins in August of each year.*

The County sends a letter to the owner of any BMP needing corrective action (structural or non-structural) giving them a deadline for addressing the items. The County performs follow up inspections to verify that compliance is achieved. If the owner does not comply, a citation or NOV is issued. A Notice of Violation is a warning letter providing owner 14 days from the date of the letter to either correct the deficiencies or request an extension in writing. A citation is the legal action taken to initiate an actual fine or civil penalty against the owner. This action takes place if after 14 days, there has been no contact with the owner.

Inspections for tree planting sites are performed by the Department of Recreation and Parks. Inspections are performed according to the Policies and Procedures: Reforestation Tree Planting on Public and Private Lands, Inspecting Forest Conservation Easements, and Inspecting Forest Conservation Easements with GIS Tools. These policies are included in the Narrative Files of the Geodatabase.

Inspections for voluntary BMPs on private property and those installed by the READY program are performed by the Office of Community Sustainability. A standard operating procedure and sample field form are included in the Narrative Files of the Geodatabase.

Long-term verification Inspections for stream restoration projects are performed by the SWMD. A protocol for these inspections is included in the Narrative Files of the Geodatabase.

2. Erosion and Sediment Control

An acceptable erosion and sediment control program shall continue to be maintained and implemented in accordance with the Environment Article, Title 4, Subtitle 1, Annotated Code of Maryland. Activities to be undertaken by the County shall include, but not be limited to:

- a. Implementing program improvements identified in any MDE evaluation of the County's erosion and sediment control enforcement authority;***
- b. Ensure that construction site operators have received training regarding erosion and sediment control compliance and hold a valid Responsible Personnel Certification as required by MDE;***
- c. Program activity shall be recorded on MDE's annual report database and submitted as required in PART V of this permit; and***
- d. Reporting quarterly, information regarding earth disturbances exceeding one acre or more. Quarters shall be based on calendar year and submittals shall be made within 30 days following each quarter. The information submitted shall cover permitting activity for the preceding three months.***

Annual Update Number 21 Status

MDE completed their evaluation of the County's application for delegation of erosion and sediment control enforcement authority and sent the County a re-authorization letter on May 1, 2015. The delegation authority is effective through June 30, 2017.

Program Improvements

Howard County submitted its renewal application for delegation of erosion and sediment control enforcement authority on October 6, 2016. MDE completed its review on November 4, 2016 and provided a verbal recommendation of MDE's extension delegation for the maximum 2-year period. The County is awaiting MDE's written review.

Responsible Personnel Certification

In accordance with the re-authorization letter issued by MDE on May 1, 2015 the following process is in place relative to the Responsible Personnel certification:

"This training may now be taken on MDE's website and all inquiries should be referred to this on-line application that will now satisfy the County's MS4 permit obligations." and, "This delegation of authority is effective through June 30, 2017."

MDE has concluded that the Responsible Personnel Certificate Information Associated Table is optional. Therefore, Howard County will not be submitting the Responsible Personnel Certificate Information Associated Table in the geodatabase for this Annual Update.

Program Activity

The electronic program activity information has been included in this Annual Update, in the database under Erosion Sediment Control Associated Table as required by Part V of the County's MS4 Permit.

Howard County, Maryland

Earth Disturbances > 1 acre

Construction Inspection Division submits quarterly reports for earth disturbances greater than one acre directly to MDE. This information is also included in the Annual Report database under Quarterly Grading Permit Feature Class and Quarterly Grading Permit Information Associated Table as required by Part V of the County's MS4 Permit.

3. Illicit Discharge Detection and Elimination

Howard County shall continue to implement an inspection and enforcement program to ensure that all discharges to and from the MS4 that are not composed entirely of stormwater are either permitted by MDE or eliminated. Activities shall include, but not be limited to:

- a. ***Field screening at least 100 outfalls annually. Each outfall having a discharge shall be sampled using a chemical test kit. Within one year of permit issuance, an alternative program may be submitted for MDE approval that methodically identifies, investigates, and eliminates illegal connections to the County's storm drain system;***
- b. ***Conducting annual visual surveys of commercial and industrial areas as identified in PART IV.C.2 above for discovering, documenting, and eliminating pollutant sources. Areas surveyed shall be reported annually;***
- c. ***Maintaining a program to address and, if necessary, respond to illegal discharges, dumping, and spills;***
- d. ***Using appropriate enforcement procedures for investigating and eliminating illicit discharges, illegal dumping, and spills. Significant discharges shall be reported to MDE for enforcement and/or permitting; and***
- e. ***Reporting illicit discharge detection and elimination activities as specified in PART V of this permit.***

Annual Update Number 21 Status

Howard County's Illicit Discharge Detection and Elimination (IDDE) program incorporates four components to meet the permit requirements:

- Prevention Program
- Detection Program
- Removal and Compliance Program
- Program Management and Reporting

Prevention Program

The County's IDDE Program uses public outreach and in-house employee training to prevent illicit discharges. Outreach is also done at community events such as the annual GreenFest event. In-house training is performed for County departments involved in the handling of chemicals and in the maintenance of facilities. The County developed a brochure for general distribution to the public to provide education about the role that the County's IDDE Program and they play in eliminating pollution entering our waterways. The brochure is available in County offices and is mailed out to targeted audiences as part of the County's outreach program. The County also utilizes an illicit discharge reporting

Howard County, Maryland

form on its SWMD website with a hotline number for public reporting of an illicit discharge. The web address is:

<https://www.howardcountymd.gov/Departments/Public-Works/Bureau-Of-Environmental-Services/Stormwater-Management/Illicit-Discharges>

The County also is proactively surveying all commercial and industrial sites in the County to identify the potential for illicit discharges before they occur.

Detection Program

The County has three programs in place to detect illicit discharges. The first is the inspection of 110 outfalls per year, with this years inspection area being the Deep Run watershed and the Route 1 corridor. The County provides maps to the contractor showing the areas where the inspections must be conducted. The contractor then identifies 110 outfalls to inspect. They visit the outfalls at least 72 hours after a precipitation event and look for flow. If they see any flow, they collect a sample and analyze it for the required analytes. They then trace the discharge up the storm drain system to identify the source. The contractor then calls the County IDDE Team Leader to report the discharge, so the County can follow up with the property owner to stop the discharge. Of the 110 outfalls inspected in this reporting period, three suspected discharges were identified and are described below.

Taylor Farms, Jessup, MD

On December 7, 2015, outfall number 218662, an outfall that services Taylor Farms located in Jessup, MD was discovered to have non-stormwater flow. A chemical test was performed and a detergent level of 0.5mg/l was detected. A survey of the storm drain network led inspectors to the Taylor Farms loading dock area, but saw no washing activity that could justify the flow. A further search of the area found a leaking dumpster and lettuce near the inlet that feeds into the outfall. A 24-hour follow-up inspection and testing of the outfall did not find a repeat violation. Taylor Farms was issued a Notice of Violation for the detergent violation. They were informed that their dumpster was leaking and that produce was also found near the inlet. Taylor Farms remediated the problem by cleaning up the discharge area; replacing the leaking dumpster; repairing screening in an inlet so that it could catch materials that might enter the storm drain system; performing weekly inspections and maintenance of the loading dock area; and providing material handling training to their staff. This case was resolved.

Lancaster Foods, Jessup, MD

On December 8, 2015, outfall number 221289, an outfall that services Lancaster Foods located in Jessup, MD, was discovered to have non-stormwater flow. A chemical test was performed and a pH of 9.4 and a chlorine level of 3.25 mg/l were detected. A survey of the storm drain network led inspectors to the Lancaster Foods rear parking area where a parked produce trailer was observed leaking fluid from its rear door. In addition, the loading area in the back of the building showed evidence of being washed down and was still wet from a discharge and produce was found scattered near the bays. Lancaster Foods was issued a Notice of Violation and contacted concerning the discharges and they remediated the site by stopping the wash down of the loading dock area, disposing of the produce, and removing the trailer which had been leaking fluids. This case was resolved.

O'Donnell Honda, Ellicott City, MD

On December 9, 2015, outfall number 220107, an outfall that services O'Donnell Honda located in Ellicott, MD, was discovered to have a non-stormwater flow. A chemical test was performed and a detergent level greater than 1.3 mg/l was detected. An inspection of the facility found that the trench drain, which was designed to catch the runoff coming from the exterior of the vehicles as they exited the

car wash building, was clogged. O'Donnell Honda was issued a Notice of Violation for the detergent violation. O'Donnell Honda remediated the problem by having the trench cleaned out. This case was resolved.

The second program is a visual survey of at least 500 commercial/industrial parcels, conducted by County inspectors. If the inspectors see any suspected discharges, they try to identify the source and notify the IDDE Team Leader. In this reporting period the County conducted 611 visual surveys and identified four suspected discharges, which are described below.

Columbia Ice Rink, Columbia, MD (Received 2 NOVs)

On June 8, 2016, a complaint came in that the Columbia Association had released melting ice from their ice skating rink into a nearby stream in Columbia, MD. No chemical test was performed because it was obvious that the release had caused a color change in the stream and it was an illicit discharge. The Columbia Association was issued a Notice of Violation for the incident. They remediated the problem by training their staff, updating their policy manual, and posting a sign over the valve that allows the discharge to be sent to a sanitary line. On June 29, 2016, employees of the ice skating rink were seen performing outdoor washing of the facility garbage cans and the wastewater was seen entering the storm drain system. The Columbia Association was issued a Notice of Violation for this incident and was also issued a \$500 citation. The citation was paid, and the Columbia Association remediated the problem through employee training.

Waverly Golf Course

On October 30, 2015, a commercial/industrial inspection was performed at the Waverly Woods Golf Course facility located in Marriottsville, MD. Evidence of vehicle washing and stains from the discharge could be seen as they led from the facility wash pad into the nearby stormwater management pond. A Notice of Violation was issued to the Waverly Woods Golf Course and the discharge was remediated through employee notification and the discontinuance of vehicle washing.

Sherwin Williams

On April 22, 2016, a commercial/industrial inspection was performed at the Sherwin Williams parking lot located in Elkridge, MD. Trash was seen scattered near the dumpster area and in the storm drain inlet. Sherwin Williams was issued a Notice of Violation and the site was remediated through cleanup of the site and employee notification through a safety meeting.

The third program responds to suspected discharges reported by the public and County employees. The County investigated each report with the results noted below:

Howard County received 67 illicit discharge complaints into our hotline number in fiscal year 2016.

There were 19 Notices of Violation (Phoenix Emporium received 2 NOVs) which led to 1 citation being issued as follows:

1. Exotic Tile received an NOV for dumping grout into the storm drain system. They remediated by cleaning the storm drain inlet.
2. Cedar Realty Trust (CRT) received an NOV for allowing their tenants to dispose of grease into the storm drain system outside of their restaurants. CRT remediated by cleaning out the storm drain inlets on their property.

3. Greentree Logistics was issued an NOV for spilling cooking oil into a stormwater management pond. The County issued an NOV, ordered the cleanup, and MDE took over the site remediation and penalties for this discharge.
4. Pastry Star was issued an NOV for allowing a baking flour discharge to enter the storm drain system. Company remediated the problem through staff training.
5. Class Produce Group was issued an NOV for allowing dumpster liquids and trash to enter the storm drain system. The company performed a cleanup of the storm drain.
6. Terreno Dorsey LLC was issued an NOV for an illicit connection into the storm drain system and for a discharge of dumpster liquids into the storm drain system. They remediated the illicit connection by disconnecting the pipe and the dumpster was replaced.
7. Marine Solutions was issued an NOV for discharging grout into a stream. Marine Solutions remediated the issue by performing a cleanup of the stream.
8. Howard County General Hospital received an NOV for an uncovered salt pile that was leaching salt into the storm drain system. The hospital remediated the situation by removing the salt pile.
9. Phoenix Emporium was issued two NOVs and one \$500 citation for the overflow of grease from their grease container. They remediated by cleaning up the grease and paying the fine.
10. Portalli's was issued an NOV for the release of grease from their grease container. They remediated by cleaning up the grease and removing their grease container.
11. Diamondback Tavern was issued an NOV for spilling grease. They remediated by cleaning up the spill and removing their grease container.
12. Masonry Perez was issued an NOV for dumping concrete into a storm drain inlet. They remediated by performing a cleanup of the inlet.
13. Cacao Lane was issued an NOV for discharging grease and remediated the situation by cleaning the spill and removing their grease container.
14. Rumor Mill was issued an NOV for their grease container, which they remediated by removing the container.
15. United Granite Countertop was issued an NOV for allowing granite sediment to enter the storm drain system. They remediated by stopping the discharge and performing a cleanup.
16. Gramercy Apartments was issued an NOV for operating an illegal car wash on their premises. They remediated by shutting down the car wash.
17. Solitude Lake Management was issued an NOV for releasing a dye into a nearby stream in violation of their MDE permit and the County's Illicit Discharge program. Solitude remediated by stopping the dye application.
18. Maryland Packaging was issued an NOV for discharging sugar and milk waste rinse water into the storm drain system. They remediated by stopping this activity and training personnel.

There were 30 sites where no illicit discharge was found due to either naturally occurring conditions such as iron floc or single episode incidences that were no longer occurring and were difficult to track, such as dumping into the storm drain.

The remaining 18 sites were referred to other County offices where the complaints were addressed per that office's protocols, such as:

- Construction Inspection for sediment issues;
- Bureau of Utilities for sewage overflows;
- Department of Planning and Zoning and Department of Inspections Licenses and Permits for miscellaneous issues covered by these departments;
- Department of Fire and Rescue Services, MDE and EPA for oil spills; and
- SHA for highway spill

Removal and Compliance Program

The County uses the procedure described below to address illicit discharges.

First Notification: Phone call, email, or inspection. The SMD inspector will complete a Field Inspection Report and leave one copy with the owner. The report will identify any problems identified and actions required. This method is used with both industrial/commercial discharges and residential (individual or Homeowners Association) dischargers.

Second Notification: The County issues a Notice of Violation (NOV) for more serious or repeat discharges. The NOV will require the owner to respond within two weeks with a plan of action, and to perform corrective action within a specified time frame (typically 60 days).

Third Notification: In the case of very serious or repeat discharges, the County will issue a citation. Under Howard County Code, prohibited discharges and illicit connections are a Class A offense, subject to a minimum fine of \$500 and a maximum fine of \$1000 per day. The County will request that all illicit discharge violators submit proof (photos, contractor's inspection notes, e-mail or notarized letter) that compliance was completed within the specified time frame. If necessary, the County will follow up at violation sites to ensure that compliance occurs in a timely and effective manner. Visual observation and, if necessary, monitoring will be performed to verify that the illicit discharge was stopped and/or necessary permit obtained.

Program Management and Reporting

Howard County has a staff of five which includes one manager and four inspectors who carry out the duties of the IDDE Program. This involves following up on reported illicit discharges and proactively doing industrial and commercial site surveys. The inspectors immediately report any illicit discharges found and the manager follows up with the owner to eliminate and remediate the issue. The IDDE program field data sheets, pictures, and support documents such as e-mails and letters are saved to the Commercial/Industrial CRM database, the IDDE CRM database, and as PDF files in the SWMD shared drive. The two IDDE CRM databases were created during this reporting period to enhance the County's IDDE program. All sites are reported to MDE at the end of the reporting period in the IDDE Associated Table.

4. Litter and Floatables

This section of the permit requires Howard County to address problems associated with litter and floatables in waterways that adversely affect water quality. Increases in litter discharges to receiving waters have become a growing concern both nationally and within Maryland and cannot be ignored. Howard County needs to evaluate current litter control problems associated with discharges from its storm drain system and develop and implement a public outreach and education program as needed on a watershed by watershed basis.

- a. As part of Howard County's watershed assessments under PART IV.E.1 of this permit, Howard County shall document all litter control programs and identify potential sources, ways of elimination, and opportunities for overall improvement.***

- b. Within one year of permit issuance, as part of the public education program described in PART IV.D.6., Howard County shall develop and implement a public education and outreach program to reduce littering and increase recycling. This shall include:*
- i. Educating the public on the importance of reducing, reusing, and recycling;*
 - ii. Disseminating information by using signs, articles, and other media outlets; and*
 - iii. Promoting educational programs in schools, businesses, community associations, etc.*
- c. Evaluating annually the effectiveness of the education program.*
- d. Submit annually, a report which details progress toward implementing the public education and outreach program. The report shall describe the status of public outreach efforts including resources (e.g., personnel and financial) expended and the effectiveness of all program components.*

Annual Update Number 21 Status

Recycling Division Programs

Howard County Recycling Division continues to provide many recycling opportunities and a variety of information to County residents and businesses, as well as County government operations. In FY16, a total of 33,228.43 tons of recyclables were collected curbside and 13,680.44 tons through drop-off programs at Alpha Ridge Landfill.

Weekly residential single stream recycling collection is provided to over 86,000 single family homes, townhouses, mobile home parks and condominiums. Three collection routes also have food scrap collection available to them. The Alpha Ridge Landfill Resident's Convenience Center accepts a wide variety of recyclable materials including: paint, manure, topsoil, reusable household items, wood waste, yard trim, food scraps, oyster shells, roofing shingles, compressed gas tanks, electronics, rigid plastics, cardboard, carpet padding, mattresses and box springs, reusable building materials, Styrofoam™, cooking oil, motor oil & filters, anti-freeze, wet cell batteries, clothing & textiles, tires, scrap metal and appliances, and single stream recycling. All County residents may use the convenience center with proof of residency; businesses must apply for a permit. On-going recycling events include electronics collection, paper shredding, Christmas tree recycling, backyard composting, trash and recycling route surveys, and a variety of education and outreach programs to audiences of all ages. Single stream recyclables are collected from County buildings and facilities on a weekly schedule; County agencies also bring items to Alpha Ridge for recycling such as wood waste and yard trim.

The County provides education and outreach to the public on the importance of reducing, reusing, recycling and waste reduction through disseminating the following information:

- During FY16, the Recycling Division distributed a significant amount of recycling and waste reduction literature to households and businesses that emphasize reducing, reusing and recycling. In addition, material was available through local libraries, public buildings and events. Outreach to businesses and residents were also achieved through the County's website, www.HowardCountyRecycles.org.
- A monthly e-newsletter is sent to 3155 residents. Residents opt-in to receive this newsletter which highlights holiday schedule changes, shredding events, tips and updates on the recycling

program. The 2016 newsletters can be found online at www.howardcountymd.gov/newsandupcomingevents.

- Print ads relevant to the importance of reducing, reusing, and recycling promoted to the general public in the following:
 - Baltimore Sun
 - The Pennysaver
 - The Parent's Guide to Howard County
 - Welcome to the Neighborhood
 - Senior Resource Guide
 - Armed Forces Directory
 - Epoch Newspaper
- A timely recycling message printed on the back of the County's tax envelopes:
- End Clutter: Choose paperless billing.
- Free-standing vertical sign at the Columbia Mall backlit directory:
 - Get the Perfect Fit! (recycling cart options)
- Promotional items that included jar openers made out of recycled tires, pencils made out recycled newspaper, crayons made from soy, reusable cutlery sets.
- Windowed recycling carts are available for display at libraries and County buildings to highlight the many items that can be recycled.
- Distribution of recycling and waste reduction literature is available at library branches, schools, County buildings, village centers, senior centers, private residences and businesses. All of the brochures we have available can be found on the County's Recycling website at www.HowardCountyRecycles.org
- Outreach through social media such as Twitter, using the twitter account @HoCoRecycles and tweet regularly to promote recycling, composting and waste reduction.
- A postcard providing positive feedback was sent to participants in the food scrap recycling program.
- In addition, relevant education material was available through local libraries, public buildings and events. Outreach to businesses and residents were also achieved through the County's website, www.HowardCountyRecycles.org.

The County's Recycling Coordinators promote educational programs in schools, businesses, community associations, etc. These programs include:

- Participate in community events with a recycling exhibit and educational materials, such as GreenFest, Wine in the Woods, Our Environment in Our Hands, Verizon Green Day, and other school festivals.
- Continued distribution of school recycling information through school programs, brochures and visually appealing lunchroom recycling posters. Programs ranging from individual classroom talks and short lunchroom presentations to school-wide assemblies were conducted for students as young as 2 years old. The County is maintaining its presence in schools that has been established over the past seven years.
- Presentations and tours of the Alpha Ridge Landfill were provided to multiple Boy Scout and Girl Scout troops to enable them to earn merit badges. Active presentations, which included a hands-on relay game and reuse crafts, were available for summer camps.
- In addition to outreach, the School Board and the County continued to collaborate on a collection contract for front-end trash and recycling collection service. This contract provides all County buildings, public school and participating Condominium properties with consistent

weekly service at a cost-competitive price. Collection is provided primarily from lidded dumpsters that have plugs/drains in them. Some locations receive recycling collection from wheeled, lidded carts similar to those used in the residential program.

- Technical support about setting up recycling collection, and education for businesses & their employees is provided as requested to businesses throughout Howard County. A section on specialty recycling along with business recycling options has been posted on the website. <https://www.howardcountymd.gov/Departments/Public-Works/Bureau-Of-Environmental-Services/Recycling/Business-Recycling>.

Adopt-A-Road Program/Trash Collection

The County "Adopt-A-Road" volunteer program continues to be very successful. The Adopt-A-Road Summary in Table 3 below, provides a breakdown of the different zones for the Adopt-A-Road program from February 1, 2015 to March 4, 2016, that details the amount of trash collected, the mileage of road adopted, and the number of roads adopted by zones. More information about the Adopt-A-Road program can be found on the County's website:

<https://www.howardcountymd.gov/Departments/Public-Works/Bureau-Of-Highways/Adopt-A-Road-Program>

Table 3: FY16 Adopt-A-Road Summary

Zone	Trash Bags Collected	Number of Roads Adopted	Estimated Miles Cleaned
Central	632	40	32
East	610	40	50
West	225	26	35
Total	1467	106	117

READY Stream Cleanup Program

In November 2015, the READY crew cleaned up trash and tires totaling approximately 3,700 pounds from Dorsey Run in the vicinity of Jenmar Road.

Department of Recreation and Parks Programs

County Council Bill 15-2015 now requires that organizers of special events shall provide a recycling receptacle to be immediately adjacent to each trash receptacle at the special event and to be clearly distinguished from trash receptacles by color or signage. The Department has implemented this new requirement at all of its special events.

Approximately two tons of trash was removed from the stream beds and wooded areas in downtown Ellicott City for Volunteer Clean-up Day which is hosted by Roger Carter Community Center.

Zone 1 has a variety of ways it uses to control the litter in their area. The main source of litter within the Zone is from the general public, as well as its athletic field users. The control means for battling the refuse is by installing trash/recycle cans and by picking up all loose trash within the Zone. Staff spends roughly 7,000 hours picking up loose trash within their Zone and another 560 hours for emptying

trash/recycle cans, for a total of 7,560 hours per year on litter control. Zone 1 has 100 trash cans within its area. Each can is pulled at least once a day, weigh approximately 40lbs. Therefore, Zone 1 empties roughly 480 tons worth of trash every year. All trash is put into dumpsters and picked up twice a week. The trash is taken to a transfer station for proper disposal. In addition to trash cans, Zone 1 also has 100 recycle dumpsters within their Zone which is pulled at least once per day. The average weight for recycle cans is roughly 40lbs. Therefore, Zone 1 empties roughly 480 tons worth of recycling each year. The recycling is taken to recycling dumpsters that are emptied twice per week and taken to a recycling center for sorting. In total, Zone 1 removes roughly 960 tons worth of trash and recycling each year.

Zone 2 maintains 113, 50 gallon trash cans throughout the parks, resulting in 42,000 lbs. of trash collected. Staff is also responsible for 71, 55 gallon recycle cans throughout the parks, resulting in 12, 100 bags collected.

Rockburn staff spends approximately 1,000 hours per year on litter removal. This averages out to approximately 35,000 of recyclables and 38,000 pounds of trash. Staff also repainted 10 storm drains in Rockburn Branch Park during FY16 with the notice: "Chesapeake Bay Drainage, Do Not Dump".

DRP Stream and Pond Cleanup Program

Since 1996, the Department has actively recruited volunteers and tracked their efforts removing trash and other debris from Howard County's waterways. In FY2016, we had 50 volunteers spend 109 hours in this program. Volunteers collected 1,193 pounds of trash and an additional 1,034 pounds of bottles, cans, tires and scrap metal were recycled. Since 1996, we have had 2,553 people spend 5,602 hours cleaning our waterways. These figures reflect the Department's participation in the Baltimore regional stream and watershed clean-up effort, "Project Clean Stream". This was the seventh year the Department participated in the International Coastal Clean-up providing one location. Since 2000, 41.29 miles of streams/ivers and 102.2 acres of lakes and ponds areas have been cleaned. Trash collected since 2000 totals 31,342 pounds with an additional 18,145 pounds of trash recycled!

The information included within this Annual Update and in applicable attachments will serve as the County's Annual Update to detail public education and outreach programs. The detailed description provided herein demonstrates a strong, pro-active public education and outreach program to reduce litter in the County.

5. Property Management and Maintenance

- a. Howard County shall ensure that a Notice of Intent (NOI) has been submitted to MDE and a pollution prevention plan developed for each County-owned municipal facility requiring NPDES stormwater general permit coverage. The status of pollution prevention plan development and implementation for each County-owned municipal facility shall be reviewed, documented, and submitted to MDE annually.***
- b. The County shall continue to implement a program to reduce pollutants associated with maintenance activities at County-owned facilities including parks, roadways, and parking lots. The maintenance program shall include these or MDE approved alternative activities:***
 - i. Street sweeping;***
 - ii. Inlet inspection and cleaning;***

- iii. *Reducing the use of pesticides, herbicides, fertilizers, and other pollutants associated with vegetation management through increased use of integrated pest management;*
- iv. *Reducing the use of winter weather deicing materials through research, continual testing and improvement of materials, equipment calibration, employee training, and effective decision-making; and*
- v. *Ensuring that all County staff receives adequate training in pollution prevention and good housekeeping practices.*

The County shall report annually on the changes in any maintenance practices and the overall pollutant reductions resulting from the maintenance program. Within one year of permit issuance, an alternative maintenance program may be submitted for MDE approval indicating the activities to be undertaken and associated pollutant reductions.

Annual Update Number 21 Status

Bureau of Environmental Services (BES)

County Facilities – Notice of Intent (NOI)

The County has identified and listed County owned and municipal sites needing a permit below. Stormwater Pollution Prevention Plans (SWPPPs) are reviewed annually, updated as necessary and placed in the associated SWPPP binder.

County Landfills

As required by the industrial NPDES discharge permits, Howard County DPW monitors surface discharge from groundwater treatment systems. The County maintains General Industrial NPDES Discharge permits from MDE for New Cut and Carrs Mill landfills and an Individual Industrial NPDES Discharge permit with Stormwater for Alpha Ridge Landfill. Alpha Ridge Landfill is the only site under the NPDES permit that has stormwater requirements. The other two sites do not have stormwater requirements associated with their NPDES permits.

Alpha Ridge – The current State Discharge Permit #13-DP-3224, NPDES Permit #MD0067865 is effective as of 2/21/15 and will expire on 1/31/20. This permit required Howard County to apply for coverage under General Permit 12-SW. Howard County submitted the NOI and SWPPP for General Permit 12-SW on 8/5/15. The landfill is still active, but the majority of Howard County's solid waste is transferred out of state to Virginia. Alpha Ridge Landfill still buries a small amount of the overall waste generated within the County. The transfer station has been operational since September 2005. The installation of the groundwater remediation system was completed in 2000 and has been operating since that time.

Park Equipment Maintenance Shops and Fueling Facilities

The MDE Wastewater Permits Program has agreed that the following park maintenance shops and fueling facilities are not required to apply for coverage under General Permit 12-SW. However, Howard County will continue to implement the BMPs identified in the previous SWPPPs at these sites.

- Banneker Fire Station
- Cedar Lane Park Equipment Maintenance Shop
- Centennial Park Equipment Maintenance Shop
- Corridor Road Fueling Facility
- Long Reach Fire Station
- Public Safety Training Center

- Rivers Park Fire Station
- Rockburn Branch Park Equipment Maintenance Shop
- Savage Park Equipment Maintenance Shop
- Schooley Mill Equipment Maintenance Shop
- Western Regional Park Equipment Maintenance Shop

County Facility Wash Racks

In August 2011 a review of vehicle washing efforts at County fire stations, police stations, and several County parks identified the need for better treatment for vehicle wash water, in particular when vehicles are washed outside. The County has begun the design phase and approximately \$2.5 million has been approved in the County's FY13 capital budget, and an additional \$1.1 million has been approved for the FY14 capital budget, to cover the cost of design and construction to retrofit the existing facilities with the needed outdoor washing systems. As part of the design the County will harvest rainwater for use in vehicle washing operations. The County has completed a feasibility study and a preliminary design of all 14 locations.

During December 18, 2014 – June 30, 2015 design was completed for four of the locations and the construction contract was put out to bid.

Construction is complete at one location, ongoing at four the locations and will start in December 2016 at three more locations. See list below of the status of all the vehicle wash pad/rainwater harvesting systems.

Table 4: Howard County Vehicle Wash Pad/Rainwater Harvesting Sites

Facility	Address	Vehicle Washing	Industrial Activities
Alpha Ridge Landfill	2350 Marriottsville Rd Marriottsville, MD	Y - washwater is directed to sanitary sewer	Y - SWPPP
Bethany Fire Station (#8)	9601 Old Frederick Rd Ellicott City, MD	Y - indoors only, outdoor wash pad under construction	N
Ellicott City Fire Station (#2)	4150 Montgomery Rd Ellicott City, MD	Y - indoors only, outdoor wash pad under construction	N
Long Reach Fire Station (#9)	5950 Tamar Drive Columbia, MD	Y - indoors only, outdoor wash pad under construction	N
Public Safety Training Center	2200 Scott Wheeler Dr Marriottsville, MD	Y - indoors only, outdoor wash pad under construction	N
Rivers Park Fire Station (#10)	10155 Old Columbia Rd Columbia, MD	Y - indoors only, outdoor wash pad under construction	N
Scaggsville Public Safety Complex (#11)	11226 Scaggsville Rd Laurel, MD	Y - indoors only, outdoor wash pad under construction	N
West Friendship Fire Station (#3)	12535 Old Frederick Rd Sykesville, MD	Y - indoors only, outdoor wash pad under construction	N

County Wastewater Treatment Plant (LPWRP)

There were no spills reported to Maryland Department of the Environment (MDE) from July 1, 2015 through June 30, 2016.

There were 107,017,000 gallons of Reclaimed Water sent to the National Security Agency from July 1, 2015 through June 30, 2016.

Annual Inspections

Plant inspections for the SPCC Plan are completed on a monthly schedule. Any significant findings are reported to the Bureau of Environmental Services with corrective actions and follow-up correspondence. Each inspection is scanned and saved at LPWRP.

Plant inspections for the SWPPP are completed on a quarterly basis. All findings are recorded and reports are sent to Environmental Services and saved at the LPWRP.

Pollution Prevention and Good Housekeeping Practices Training

For all industrial permits listed below, SWPPPs have been developed for each site and employees are trained annually, at minimum. Each year County staff is required to attend training which includes the SPCCs, the SWPPPs, IDDE and handling hazardous wastes. Training for FY16 was completed in September and October 2016.

The following inspections are conducted at the facilities covered by the industrial permits

- Alpha Ridge Landfill
 - Weekly inspections of drainages areas which include unstabilized landfill areas, active land application areas, material storage, and waste exposed to precipitation.
 - Monthly inspections of the rest of the drainage areas.
 - Quarterly facility inspections of the entire site.
 - Quarterly visual monitoring inspections of flow from each outfall. This was required to start in the first full quarter after the County was notified of coverage under 12-SW, which was the fourth quarter of calendar year 2015.
 - Quarterly Benchmark monitoring of the outfalls from drainage areas that call with Sector L: Landfill and Land Application Sites, and Sector C: Chemicals and Allied Products (the pilot composting facility). Benchmark monitoring was required to begin in the first full monitoring period six months after the County was notified of coverage under 12-SW, which was second quarter of calendar year 2016.
 - Annual Comprehensive Site Compliance Evaluation (CSCE or Annual Inspection) of the entire site.
- All Other Sites
 - Quarterly facility inspections of the entire site.
 - Quarterly visual monitoring inspections of flow from each outfall.
 - Annual Comprehensive Site Compliance Evaluation (CSCE or Annual Inspection) of the entire site.

Reports of the inspections described above are included as narrative files included in the geodatabase.

Bureau of Highways (BOH)

The Bureau of Highways (BOH) is responsible for addressing a number of issues concerning pavement, sidewalks, storm drains, and trees along more than 1,000 miles of County roads for the convenience and safety of the public. This work includes preservation efforts such as road crack-sealing and tree trimming, and remedial efforts such as County road snow removal and filling potholes. Some of the areas of operation that the BOH has focused on during the current permit year include:

Street Sweeping

The BOH has continued performing street sweeping with the assistance of a private contractor. Street sweeping occurs on curbed County roadways which total approximately 1,376 curb miles. During the period of July 1, 2015 through June 30, 2016, the BOH collected approximately 930.68 tons of street debris via street sweeping. Each street is swept three to four times a year. Each sweeping cycle takes from six to nine weeks to complete. Cycles generally begin in the months of January, April, July and September. In general, each cycle begins in the east part of Howard County and moves westward.

Inlet Cleaning

The BOH cleans and repairs storm drain inlets as needed as complaints are reported. In the fall, the County removes leaf litter from storm drain inlets as needed.

Pesticides, Herbicides and Fertilizer

The County continues to minimize the amount of pesticides, herbicides and fertilizer used. The chemicals listed in the Chemical Application Associated Table of the geodatabase were used to control vegetation along the county's guard rails.

Snow and Ice Removal

The BOH continues to utilize and update AVL and GIS technology to record where and when de-icing chemicals were applied on county roads during winter storm events. This minimizes the possibility of inadvertent multiple applications of deicing chemicals. The chemicals listed in the Chemical Application Associated Table of the geodatabase were used to for deicing the County's roads in FY16. According to the Baltimore, MD Snowfall data available from the National Weather Service Forecast Office for the Baltimore/Washington area, Howard County received approximately 35 inches of snowfall during the 2015-2016 winter season. MD Snowfall data are available online at <http://www.weather.gov/media/lwx/climate/bwisnow.pdf>.

Snow and Ice Removal Training

The BOH holds a Snow Rodeo event every October which Highway staff are required to participate. At this event staff use their skills to navigate through a course for them to drive a full size snow plow through narrow pathways while missing all obstacles. In addition to missing obstacles the crews practice backing up without hitting a barrier, pushing a log into a designated slot. This event is a fun activity that also allows the County snow plow/salt truck drivers to hone their skills and make them more efficient during actual snow/ice events.

Department of Recreation and Parks (DRP)**Inlets, Storm Drains, and Swales**

Zone 1 staff maintains a variety of inlets, storm drains, and swales within their respective sites. There

are 40 storm drains that are located within Zone 1. The maintenance of the storm drains are painting, cleaning out, replacing hardware, and maintaining positive drainage. Staff spends roughly 50 hours per year on storm drain maintenance. Staff also maintains 10 inlets performing the following functions: removing invasive materials, maintaining a proper buffer zone, fixing any hardware issues, and litter/debris removal. This effort takes approximately 60 hours per year. Staff also maintains roughly 1,000 feet of swales through litter/debris removal, maintaining positive drainage, and routine trimming. This effort takes approximately 50 hours per year.

Zone 4 staff in the Highways division assisted with swale maintenance by stabilizing over 300 feet of swales with rip rap.

Pesticides, Herbicides and Fertilizer

The County continues to minimize the amount of pesticides, herbicides and fertilizer used. The chemicals listed in the Chemical Application Associated Table of the geodatabase were used to control vegetation in County Parkland. The Department of Recreation and Parks has staff in the following divisions that are certified by the State of Maryland for pesticide application:

- Horticulture and Land Management Division
- Natural Resource Division
- Park Operations
- Park Renovations

Snow and Ice Removal

DRP continues to utilize deicing chemicals were appropriate for treating roadways in County parks. Approximate 6000 pounds of deicing materials were used in FY16.

For additional information relevant to Recreation and Parks property management and maintenance activities, please refer the DRP FY2016 NPDES Report narrative file included with the geodatabase.

6. Public Education

Howard County shall continue to implement a public education and outreach program to reduce stormwater pollutants. Outreach efforts may be integrated with other aspects of the County's activities. These efforts are to be documented and summarized in each annual report. The County shall continue to implement a public outreach and education campaign with specific performance goals and deadlines to:

- a. Maintain a compliance hotline or similar mechanism for public reporting of water quality complaints, including suspected illicit discharges, illegal dumping, and spills.***
- b. Provide information to inform the general public about the benefits of:***
 - i. Increasing water conservation;***
 - ii. Residential and community stormwater management implementation and facility maintenance;***
 - iii. Proper erosion and sediment control practices;***
 - iv. Increasing proper disposal of household hazardous waste;***
 - v. Improving lawn care and landscape management (e.g., the proper use of herbicides, pesticides, and fertilizers, ice control and snow removal, cash for clippers, etc.);***

- vi. *Residential car care and washing; and*
- vii. *Proper pet waste management.*

c. *Provide information regarding the following water quality issues to the regulated community when requested:*

- i. *NPDES permitting requirements;*
- ii. *Pollution prevention plan development;*
- iii. *Proper housekeeping; and*
- iv. *Spill prevention and response.*

Annual Update Number 21 Status

Compliance Hotline

The Howard County website posts a Hotline number, (410) 313-6447, which visitors can call to reach the Bureau of Environmental Services. Managers and inspectors responsible for the County's IDDE program respond to these calls within 24 hours, Monday through Friday. Complaints that come in during the weekend are referred to 911 or the 24 hour MDE Spill Hotline at (866) 633-4686.

Complaints include but are not limited to illicit discharges, dumping and spills. All complaints are kept in a database. The County website also hosts an illicit discharge form that visitors can fill out and send directly to the manager of the IDDE Program. In addition, the County also is part of See Click Fix, a smartphone application that allows anyone in Howard County to report an illicit discharge directly to the IDDE Manager.

Increasing Water Conservation

READY Program (A green jobs training and environmental stewardship program)

Twelve hour-long lessons were delivered, split between two local elementary schools, on the topic of water conservation. Specifically, the lessons covered water use by a population, freshwater availability, where drinking water comes from and where it goes.

Robinson Nature Center

Using the building as a teaching tool, Robinson Nature Center facility educates the public about green technologies, sustainability, environmental stewardship and techniques that can help reduce stormwater runoff, as well as reducing water and energy consumption:

- *Stormwater mitigation* is achieved on the property through a pervious concrete parking lot and four separate bioretention/rain gardens. Both of these items are highlighted on our LEED tours which we offer by group reservation as well as during special events throughout the year. The parking lot is vacuumed as needed during the year to maintain its pervious nature. Our maintenance staff monitors and maintains the plantings within the four bioretention areas. These features are also highlighted for visitors with interpretive signs.
- *Interpretive signage* in the building and on the grounds describes to visitors how different features reduce the environmental impact of the building by mitigating stormwater runoff and minimizing water and electricity use.

Staff at the Robinson Nature Center offer professional development opportunities to school teachers that allow them to bring water conservation and stewardship issues back to the classroom.

In FY2016, Robinson Nature Center continued to serve as a Green School Center. This status was given in 2013 by the Maryland Association of Environmental and Outdoor Educators (MAEOE) in recognition of Robinson's commitment to providing professional development opportunities, community support and innovative lessons to schools certifying or recertifying as Maryland Green Schools. Water conservation/stewardship is among one of many categories that schools must report on to achieve this status and are issues that both students and teachers can learn about at the Center.

In FY2016, Robinson Nature Center and the Howard County Conservancy teamed up to offer the public a series of environmental education workshops including Projects WET, WILD, Learning Tree and WOW. Each of these curriculums touches on water quality/conservation issues and gives teachers the tools they need to educate about these issues at their own schools.

Environmental Quality Incentives Program (EQIP)

The USDA, NRCS continued to work with the HSCD to administer EQIP, the main conservation cost-share program available to farmers and farm owners from the federal agriculture department. The following practices were installed in the County through this program:

- (1) 2400 square feet High Tunnel
- (2) 2 each Watering Facility
- (1) 0.1 acre Heavy Use Area
- (2) 0.6 acre Critical Area Planting
- (1) 1 each Sediment Erosion Control Pond

Conservation Reserve Enhancement Program (CREP)

The USDA continued to work with HSCD to administer CREP, a streamside buffer cost-share program available to farmers and farm owners from the federal agriculture department. No practices were installed in the County through this program.

Practices Completed With State or Local Cost Share or Without Cost Share Assistance

These practices were completed with technical assistance from the HSCD. Some projects received cost sharing from either Maryland Agriculture and Water Quality Cost Share (MACS) program or Patuxent Reservoirs Watershed Protection Group local cost-share program while other practices received no cost-share.

- (6) 2.9 acres Grassed Waterway
- (2) 2 each Watering Facility
- (1) 259 feet Diversion
- (1) 1 each Spring Development
- (3) 3 each Grade Stabilization Structure
- (1) 1 each Stream Crossing

Conservation Planning

In providing technical assistance, the HSCD writes conservation plans. Plans are also written for land that is proposed for the agricultural land preservation program. Also, existing preservation parcels

have conservation plans that may be updated. There were 20 new conservation plans on 2488.2 acres and 10 revised conservation plans on 1263 acres written by the HSCD office.

Environmental Stewardship

In partnership with the National Security Agency (NSA) and Howard County LPWRP, highly treated wastewater is diverted and utilized as cooling water for national security technology. Much of the water will be evaporated during the cooling process.

A carbon-neutral power backup system was created at the Plant, which includes the combination of solar panels and diesel generators to ensure the Plant operates in all weather conditions and avoids potential overflows.

Plant personnel also attend the Howard County Fair to hand out information on the treatment plant and on how to keep the sewers from getting clogged and causing overflows. This information includes proper disposal of grease.

Stormwater Management – A study was conducted to determine the cause of deterioration of 3 stormwater outfalls at the Plant along the Little Patuxent River. Out of the study a project was started to rehabilitate the three outfalls. The design was nearly completed by June 30, 2016. The project will be completed in FY17.

Residential and Community Stormwater Management Implementation and Facility Maintenance**Rain Barrel Program**

The SWMD continues to provide residents with free barrels through the County's Rain Barrel Program. Predrilled rain barrels are available free of charge to residents who attend seminars at the Alpha Ridge landfill. Residents purchase the hardware needed and the Master Gardeners provide free instruction on how to assemble the rain barrels. In FY16, Howard County gave away 80 rain barrels to residents. The County also provided free rain barrels to residents at GreenFest and at events sponsored by the Middle Patuxent Environmental Area (MPEA). Forty-two rain barrels were given away at GreenFest, and 27 rain barrels were given away at MPEA in 2016.

Middle Patuxent Environmental Area (MPEA)

The MPEA Integrated Natural Resources Management Plan for the 1,021-acre environmental area was initially drafted in June 2000, and was last updated in January 2016. The plan outlines strategies, techniques and protocols for environmental education, research, recreation, natural resources management and administration. The plan is updated annually.

The implementation of the plan's projects and programs in FY16 has included the following accomplishments:

- The MPEA Independent Trail Maintenance Team volunteer program contributed 285 hours in FY16, with much of the time being spent on the installation and maintenance of drainage and erosion control structures. Check dams and water bars were installed and maintained along trails through riparian areas where trail erosion was evident.
- MPEA staff completed a systematic evaluation of all 35 storm drain outfalls within the environmental area in 2010, and in 2011 an additional 38 storm drain outfalls outside but

impacting the area were inspected. Outfalls were placed into severity rating categories as follows: 1 – fairly good (about 50%), 2 – slight to moderate erosion (17%), 3 – slight to moderate erosion with severe stream bank erosion downstream (14%), 4 – moderate to severe erosion; unstable; some impact to infrastructure (14%), 5 – infrastructure damaged/under repair (5%). During the evaluation, one storm drain outfall with severe erosion and infrastructure damage was referred to the Stormwater Management Division and was repaired in 2012 using a regenerative stormwater conveyance design. This project now serves as a demonstration site for innovation in SWM techniques. In 2013, MPEA staff trained volunteers from the Middle Patuxent Environmental Foundation to repeat the original storm drain outfall surveys. 2013 data was compared to the baseline data from 2010 in order to monitor whether the outfalls were stable or if the erosion was progressing and to recommend actions to minimize future erosion. In FY16, MPEA staff continued to monitor SDO's for erosion, as well as monitoring the two repaired SDO's at New Country Lane and Great Oak Way for function, tree planting success, and invasive species control.

READY Program (A green jobs training and environmental stewardship program)

Twelve hour-long lessons were delivered, split between two local elementary schools, on the topic of water conservation. Specifically, the lessons covered water use by a population, freshwater availability, where drinking water comes from and where it goes.

The READY Program launched a fee for service maintenance program during this time period. The program included letters to past customers who installed rain gardens, explaining the importance of maintaining them in order to preserve functionality. A more in depth brochure was also created for interested BMP owners.

READY maintained rain gardens at 3 Howard County schools and taught teachers and students how to do their own basic maintenance.

READY delivered a presentation on salt tolerant rain gardens at Howard County GreenFest 2016 and encouraged attendees to participate in the construction and learn about the general principles of stormwater management.

READY delivered 6 "Introduction to Stormwater" lessons at two elementary schools. Specifically, the lessons covered the definition of BMP, introduced different types of BMPs and described what conditions they are best suited for.

READY stenciled stormwater inlets in 2 neighborhoods and at 2 schools to raise awareness about the destination of stormwater, for a total of about 27 drains stenciled.

READY Program Participants constitute 45 young persons who increased their understanding of stormwater principles through participation in the program.

READY developed a neighborhood stormwater management plan for the Greenleaf neighborhood in Columbia, MD. The management plan was presented and explained to a HOA meeting of 35+ people, building support for stormwater mitigation efforts in the HOA and educating the HOA members about stormwater management.

Commercial/Non-residential**Commercial Credit and Reimbursement Program**

During this time period, the Office of Community Sustainability continued the commercial credit and reimbursement program. Eligible property owners were awarded a credit against the Watershed Protection Fee for on-site stormwater management. Before the July 2015 Fee was issued, 49 commercial properties had joined this program. There have been no commercial reimbursements granted to date.

Commercial Task Force

In the spring of 2016 the Howard County Executive formed a task force of 11 business property owners with a request that over a series of meetings they review commercial stormwater issues and offer recommendations on ways to increase involvement of these private properties in initiatives to increase impervious area stormwater management. This group which included commercial property owners, consulting engineers, commercial property managers, and the UM Environmental Financing Center met over 4 months, being educated on the MS4 program mandate challenge, and reviewing other programs including those in Washington DC and Philadelphia. The ability to find partnerships with these property owners is fundamental to the success of Howard County's MS4 mandate since over 70% of the impervious cover needing management is in private ownership. The group offered 7 recommendations with supporting justification.

1. Target the largest, owner-occupied, commercial and industrial properties with significant areas of land not in use. Recognize that the vast majority of properties will not meet these criteria and will have to be engaged as well.
2. Make outreach and education of the commercial sector as simple and relevant as possible, answering the questions of "why is it their problem?" and "how can participation benefit the owner?". Include messages that (1) there are consequences of the County not meeting its MS4 stormwater permit and (2) the burden of participation will be fairly distributed among all sectors of the county.
3. Develop standard and separate access and maintenance agreements for stormwater projects to meet the MS4 permit obligations. Provide owners with the option of self-performing maintenance or having the County or a third-party perform maintenance.
4. Streamline the permitting process for stormwater management projects needed to meet MS4 permit obligations and consider the options of (1) using standard stormwater designs, (2) hiring a dedicated stormwater permit reviewer, and/or (3) allowing "peer-review" of stormwater permits.
5. Reduction or elimination of the stormwater fee is an insufficient financial incentive for commercial property owners to construct stormwater projects. The county program should consider (1) funding up to 100% of projects, (2) reducing the stormwater fee for owner performed maintenance, (3) tax credits for stormwater projects, (4) relief from parking space requirements and (5) green certification.
6. Create a commercial stormwater program ideally modeled after the current County nonprofit program and similar to turnkey programs in other counties.

7. Ensure a balance of revenue and costs through cost effective implantation and adequate funding. Recognize that the County will need to increase its stormwater fee or property tax, or reduce expenditures from other programs if funds cannot be obtained from other sources.

The report is under review by the county Executive and Council and staff will soon be determining how to accomplish and/or pilot some of these recommendations. Again, finding a way to involve the owners of these large impervious parcels is fundamental to the success of the County's MS4 mandate.

Non-Profits

Watershed Protection Partnership

During this period, the Office of Community Sustainability continued the Non-Profit Watershed Protection Partnership (NPWPP). In this Partnership, the County grants a 100% credit to non-profits in exchange for the ability to assess for and implement stormwater management projects on their properties. This program not only accomplishes impervious surface management, but also involves key stakeholders in the stormwater remediation problem, thus increasing public buy-in. There are 218 parcels in the NPWPP, which totaled to approximately \$469,000 of Watershed Protection Fee credits during fiscal year 2016.

Two contractors were hired to perform site assessments, designs, and installations of stormwater management practices on NPWPP property. These contractors were instructed to perform the maximum amount of impervious treatment possible for the total available funding of \$2 million, \$1 million of which was furnished by an external grant. A portion of these funds were expended during fiscal year 2016.

Residential

CleanScapes

Since an estimated 40% of impervious surface in Howard County is located on residential properties, a residential stormwater program is advisable. The CleanScapes program, administered by the Office of Community Sustainability, offers County residents reimbursement for installation of stormwater Best Management Practices (BMPs) and credit toward the Watershed Protection Fee. During fiscal year 2016, \$39,898 in reimbursements were granted to 62 residents. 37 residents were also granted a credit against the Watershed Protection Fee, for a total of \$945 in credits. The CleanScapes program also includes periodic public events and promotional materials to improve public education and buy-in. By the end of fiscal year 2016, approximately 2.8 acres of impervious surface were treated by stormwater BMPs on about 150 residential lots.

CleanScapes Communities

The CleanScapes Communities pilot program was developed to increase the number and geographic diversity of residential stormwater BMPs in the County. The program was developed utilizing residential input in a Chesapeake Bay Trust-funded focus group and mimicking elements of successful residential stormwater programs.

Two contractors were hired to install rain gardens and rain barrels on residential property utilizing watershed protection funds and a grant from the National Fish and Wildlife Foundation (NFWF). Several elements were adopted to minimize barriers to homeowner BMP implementation including: high subsidy of Best Management Practices (75% covered up-front by Fee funds and NFWF grant), County provision of qualified contractors to install BMPs for homeowners, personal consultations and customized BMP designs for homeowners, provision of maintenance tips and packages to homeowners, plant and structural guarantees for BMPs through the contractors, and complete subsidy of BMPs for low-income homeowners. Contractors were also responsible for educating homeowners on the function and impact of the installed stormwater BMPs, increasing public education on stormwater management. Preliminary results indicate strong, positive changes in homeowner knowledge and attitude toward stormwater management after participation in this program, as well as a desire to engage in other stormwater-mitigating practices on their properties. One of the contractors hired for the CleanScapes Communities project had never performed work on residential properties, encouraging the growth of the residential BMP field.

Approximately 26 homeowners will participate in this program, managing about 0.6 acres of impervious surface. Advertising efforts, meetings, and events for this program have reached many more than the actual number of participants.

Proper Erosion and Sediment Control Practices

Construction Inspection Division

The Construction Inspection Division (CID) responds to citizen complaints as they relate to development projects under construction. Often times when addressing citizen complaints, it becomes a public education opportunity describing the situation and BMP practices used to address their concerns as they relate to stormwater are explained.

Soil Conservation District

When county residents who reside on private property are having issues with erosion and/or drainage, the Soil Conservation District staff is contacted. A District staff member will meet with the resident to review the issues and consider options. The District will then put together a recommendation report for the resident with recommendations to repair and prevent additional erosion or drainage issues.

Increasing Proper Disposal of Household Hazardous Waste

The County provides a multifaceted approach to proper management and diversion of household generated hazardous waste. These includes a brochure and webpage highlighting what is accepted and not accepted through the County's permanent collection program, along with ways to minimize through safe alternative products other than the standard household chemicals. Promotional material like the brochures are placed at County buildings and libraries.

Improving Lawn Care and Landscape Management

At the Robinson Nature Center Facilities backyard demonstration area shows the public what they can do on their own properties to improve the management of water. Rain barrels demonstrate catchment of water for use in the garden and a compost bin shows how fertilizer can be produced from organic food scraps and reducing the amount of chemical fertilizers that need to be used.

Master Gardener Program

Since 2013, Howard County Master Gardeners have held free compost demonstrations at the Center during which residents of the County were provided with instructions on how to create and manage their own backyard compost piles. Howard County's Office of Recycling provided free compost bins to residents at these demonstrations. The residential composting operations allow families to use organic, natural fertilizer in place of commercial and chemical fertilizer. In addition to providing the composting demonstration area, the staff at Robinson Nature Center actively composts organic food waste at the center.

Residential Car Care and Washing**Public Education**

Residential car care and car washing topics are included in presentations to the public and outreach activities to schools. The County has spoken to the Howard County Public Schools regarding the car wash fundraisers that were being done by many schools. An explanation of the IDDE program and what they can and cannot enter the storm drain system was provided and in general school car wash fundraisers have stopped.

Proper Pet Waste Management**The Bark Ranger Program**

In the summer of 2015, the Park Rangers of Howard County Recreation and Parks implemented a new initiative program. "Bark Ranger" encourages patrons to clean up after their pets, more specifically dogs, and to use a leash while visiting Howard County parks. It is important to keep dogs on a leash. Not only is it the law but it is being considerate to the other park patrons. Dog feces not picked up is unsightly and negatively impacts our ground and surface water, and attracts rodents. Residents and their dogs are encouraged to take the pledge and be committed to protecting our environment. Since FY15, a total of 3,052 residents, 2,390 residents in FY16 alone, have signed up and have taken the Bark Ranger pledge:

*"My Human and I care about our environment and the safety of others around us.
We pledge to do our "doodie" and clean up after ourselves. I will remain on my leash by my
Human's side at all times."*

As part of the Bark Ranger pledge, participants receive a Bark Ranger cloth bandanna and a plastic bone which contains baggies to remove pet excrement. Through this initiative, visitors of Howard County Recreation and Parks facilities are made aware of the negative environmental impact that pet feces have and are appreciated for the "dirty jobs" of pet-ownership and rewarded with a small token.

For additional projects and activities from the Department of Recreation and Park related to Public Education see the DRP FY2016 NPDES Annual Report included as a narrative file in the geodatabase.

Information Provided to the Regulated Community

The County provides various stormwater quality to the regulated community related to:

- NPDES Permitting Requirements

- Pollution Prevention Plan Development
- Proper Housekeeping
- Spill Prevention and Response

This information is provided when requested, through presentations, mailings, telephone conversation and one-on-one discussions in person.

Other Public Outreach and Education:**Stream Mapper**

The Office of Community Sustainability's contractors developed a stream monitoring app, the Stream Mapper, and a new user-friendly website, www.streammapper.org for data collected by app users. The website also provides education about watersheds and water quality. This app encourages County residents to visit local streams and collect basic information indicating stream health. This app not only encourages the public to become invested in local stream health, but has helped the County to detect and fix a sewer leak and a loose manhole. One local group used the app to find a trash cleanup site, resulting in the removal of 3,700 pounds of trash. Several local groups and projects utilize the stream mapper including: the Howard County Watershed Report Card Project, the Howard County Watershed Stewards Academy, Patapsco Heritage Greenway, the Howard County Sierra Club, and Howard Community College. To date, the app has 266 users and 157 reports.

Storm Drain Stenciling

The Office of Community Sustainability developed a storm drain stencil with a local message, "Only Rain Down the Drain: Drains to Patuxent River/Patapsco River" to remind residents that materials dumped in storm drains will result in degradation of local water bodies. To date, over 260 drains have been stenciled by local groups including: Eagle Scouts, Boy Scouts, Girl Scouts, Howard Community College, Howard County Public Schools, Howard County Watershed Stewards Academy, Baltimore Aircoil Company, and the READY program. The message itself will remind passersby not to pollute, but has also educated the volunteers stenciling the drains and the communities witnessing the projects.

Community Groups

The Office of Community Sustainability participates in several groups which educate the public about stormwater management, most prominently: the Howard County Watershed Stewards Academy (WSA), the Watershed Improvement Network (WIN), the Howard County Earth Forum, the Watershed Report Card Program, the Maryland Association of Floodplain and Stormwater Managers (MAFSM), the Sierra Club, and Transition Howard County.

Department of Health

The Howard County Health Department continues to maintain information on its webpage noting that old prescriptions and medicines should not be poured down the drain or flushed since it may negatively affect the quality of streams, waterways, and the Bay. As part of the on-going Bay Restoration Fund (BRF) grant program, the Health Department is identifying and inspecting qualifying properties with failing septic systems, coordinating the connecting of qualifying homes currently on septic systems within the Metropolitan District, and also evaluating system upgrades for acceptance into the grant program. State

legislation effective January 2014, currently requires that all new construction utilizing on-site sewage disposal, must be outfitted with BAT units which may create an across the board reduction in the nitrogen levels potentially impacting overall TMDL limits. New draft regulations released in September 2016, if passed, will enable non-critical area counties (including Howard) the ability to exercise flexibility in requiring BAT units for all new construction. This flexibility will help enable a better targeted application of BRF funding, while leaving in place public health priorities. The current grant award of \$201,000 is through June 2017 with the potential for an additional supplement midway through the year. The completion of upgrades to most major Wastewater Treatment Plants is now complete, which means that additional funding beginning in FY 2018 will be available for stormwater, combined sewer systems remediation and potentially BRF funding for septic systems. Proposals to MDE will be prioritized upon readiness to proceed, benefit to the public and groundwater. MDE, through HB12 legislation, has established criteria for additional funding criteria to cover administrative costs of the BRF program for each county based upon county agreed to levels of support. Howard County has secured funding through FY 2018 for level 1 support (\$30,000 each year). Future renewals and/or supplemental funding will be based upon established criteria and available funding distributed by MDE.

E. Restoration Plans and Total Maximum Daily Loads

In compliance with §402(p)(3)(B)(iii) of the CWA, MS4 permits must require stormwater controls to reduce the discharge of pollutants to the MEP. By regulation at 40 CFR §122.44, BMPs and programs implemented pursuant to this permit must be consistent with applicable WLAs developed under EPA approved TMDLs (see list of EPA approved TMDLs attached and incorporated as Attachment B).

Howard County shall annually provide watershed assessments, restoration plans, opportunities for public participation, and TMDL compliance status to MDE. A systematic assessment shall be conducted and a detailed restoration plan developed for all watersheds within Howard County. As required below, watershed assessments and restoration plans shall include a thorough water quality analysis, identification of water quality improvement opportunities, and a schedule for BMP and programmatic implementation to meet stormwater WLAs included in EPA approved TMDLs.

1. Watershed Assessments

a. By the end of the permit term, Howard County shall complete detailed watershed assessments for the entire County. Watershed assessments conducted during previous permit cycles may be used to comply with this requirement, provided the assessments include all of the items listed in PART IV.E.1.b. below. Assessments shall be performed at an appropriate watershed scale (e.g., Maryland's hierarchical eight or twelve-digit sub-basins) and be based on MDE's TMDL analysis or an equivalent and comparable County water quality analysis.

b. Watershed assessments by the County shall:

- I. Determine current water quality conditions;*
- II. Include the results of a visual watershed inspection;*
- III. Identify and rank water quality problems;*

- IV. *Prioritize all structural and nonstructural water quality improvement projects; and***
- V. *Specify pollutant load reduction benchmarks and deadlines that demonstrate progress toward meeting all applicable stormwater WLAs.***

Annual Update Number 21 Status

Under Howard County's current MS4 permit (Part IV.E.1), the County is required to develop Watershed Assessments to assess current conditions and to identify restoration opportunities to address pollutant reductions in approved TMDLs. In accordance with this requirement, Howard County's SWMD sponsored assessments of the Little Patuxent and Middle Patuxent Watersheds in 2015 which were reported on in AR20. In 2016 the County completed assessments in the Patuxent watersheds (Brighton Dam, Patuxent River Upper, and Rocky Gorge Dam) and the Patapsco watersheds (Patapsco River Lower North Branch, Patapsco River South Branch) thereby completing assessments of all of the County's watersheds. All field work, analysis, and project site concept plans are complete. The County has scheduled public meetings in late January of 2017 to introduce the assessment results and provide the assessments for a 30-day comment period. Following the comment period the County expects the assessments to be finalized in the spring of 2017.

Employing GIS analyses and field investigations, the project team recommended a suite of opportunities including upgrades to existing stormwater BMPs, new BMPs, tree plantings, stream restoration, and stabilization of stormwater outfalls.

The Brighton Dam, Patapsco River Lower North Branch, Patapsco River South Branch, Patuxent River Upper, and Rocky Gorge Dam Watershed Assessments were tailored to address the latest MS4 requirements, with a focus on identifying and ranking opportunities based on the restoration of untreated impervious area and the reduction of urban stormwater loads of nitrogen, phosphorus, and sediment. These assessments were specifically designed to assess current water quality conditions and identify the most effective management measures to reduce stormwater pollutant loads to address both the Chesapeake Bay TMDL (in all watersheds) and the local sediment and bacteria TMDL in Patapsco River Lower North Branch, the local nitrogen and phosphorus TMDL for the Baltimore Harbor (which includes Patapsco River Lower North Branch and Patapsco River South Branch), the local sediment TMDL for Patuxent River Upper, the local phosphorus TMDL for Rocky Gorge Dam, and the local phosphorus TMDL for Brighton Dam. The permit also requires treatment of 20% of the County's impervious area that has not been treated to the Maximum Extent Practicable (MEP). This target was considered in development of the watershed plans, such that the benefits of implementing individual projects were computed in terms of impervious acres treated, or equivalent acres treated, as per MDE guidance.

The watershed assessments evaluated current water quality conditions based on stream monitoring data collected by Howard County, MBSS, and Maryland Stream Waders, along with GIS analyses of treated and untreated impervious cover, land use, and other landscape factors.

Visual watershed inspections were carried out via extensive field surveys. Field data collection was customized for each of the five site types (existing BMPs with potential for upgrade, areas of uncontrolled impervious for new BMP implementation, pervious urban land for tree planting, degraded stream channels, and unstable stormwater outfall channels) focused on assessing current conditions and identifying and describing restoration opportunities. Some sites previously visited in earlier studies were evaluated via desktop assessment only. In Brighton Dam, a total of 46 sites and 2.9 stream miles were assessed. In Rocky Gorge, 12 sites and 1.4 stream miles were assessed. In Patuxent River Upper, a total of

16 sites and 3.2 stream miles were assessed. In Patapsco South Branch, a total of 32 sites and 11.4 stream miles were assessed. In Patapsco Lower North Branch, a total of 230 sites and 33.6 stream miles were assessed.

A scoring system was used to select the highest-ranked projects in each watershed for concept plans to be developed at this time, out of a larger group of potential projects identified. In all, the Brighton Dam Watershed Assessment yielded 82 potential projects and produced concept plans for 21 of the top ranked opportunities identified. The assessment for Rocky Gorge Dam yielded 21 potential projects and produced concept plans for 6 top ranked opportunities. The assessment for Patuxent River Upper yielded 15 potential projects and produced concept plans for 14 top ranked opportunities. The assessment for South Branch Patapsco yielded 60 potential projects and produced concept plans for 15 top ranked opportunities. The assessment for Patapsco Lower North Branch yielded 269 potential projects and produced concept plans for 130 top ranked opportunities.

A pollutant load spreadsheet model was created to calculate the expected nutrient and sediment loading reductions that would result based on implementation of restoration opportunities identified as part of the watershed assessments. Pollutant load calculations and removals by BMPs were completed for the Chesapeake Bay TMDL for nitrogen, phosphorus, and sediment, in both watersheds, and the multiple local TMDLs.

Modeling results included a summary of estimated pollutant load reductions for the implementation of recommended projects, including how reductions were credited, pollutant removal efficiencies, potential load reductions, and units available for restoration. A summary of the estimated pollutant load reductions for each watershed is presented in the table below. Additional reductions may also be achieved through restoration actions not included in this analysis such as street sweeping, erosion and sediment control, and public education and outreach efforts (e.g., a watershed trash and recycling campaign, conservation landscaping, pet waste education). These may be added as progress toward TMDL goals is tracked over the next several years.

Table 5. Pollutant Load Reductions and Impervious Credit

	Number of Projects	Impervious Credit (acres)	Estimated Load Reductions		
			TN-EOS lbs	TP-EOS lbs	TSS-EOS lbs
Patapsco Lower North Branch	130	1,133	8,855	5,291	3,896,464
BMP Conversion	41	355	2,971	395	604,793
New BMP	12	15	150	17	23,535
Stream Restoration	44	711	5,329	4,832	3,197,385
Tree Planting	10	5	60	3	2,032
Outfall Stabilization	6	2	0	0	0

Outfall Stabilization - SPSC	17	46	345	45	68,719
South Branch Patapsco	15	178	1,488	1,162	770,614
Stream Restoration	11	165	1,275	1,156	765,135
Tree Planting	2	10	204	6	4,701
Outfall Stabilization	1	1	0	0	0
Outfall Stabilization - SPSC	1	1	9	1	778
Brighton Dam	19	84	1,055	425	290,387
BMP Conversion	4	20	491	36	31,228
New BMP	7	3	39	4	2,992
Stream Restoration	6	56	417	378	250,425
Tree Planting	1	1	24	1	379
Outfall Stabilization - SPSC	1	3	84	6	5,363
Patuxent River Upper	10	70	572	354	231,215
BMP Conversion	2	14	140	16	8,630
New BMP	1	2	25	3	1,337
Stream Restoration	4	49	364	330	218,250
Outfall Stabilization - SPSC	3	6	43	5	2,998
Rocky Gorge Dam	6	46	411	274	182,811
Stream Restoration	4	40	298	270	178,830
Tree Planting	2	7	113	4	3,981

2. Restoration Plans

- a. Within one year of permit issuance, Howard County shall submit an impervious surface area assessment consistent with the methods described in the MDE document "Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated, Guidance for National Pollutant Discharge Elimination System Stormwater Permits" (MDE, Jun. 2011 or*

subsequent versions). Upon approval by MDE, this impervious surface area assessment shall serve as the baseline for the restoration efforts required in this permit.

By the end of this permit term, Howard County shall commence and complete the implementation of restoration efforts for twenty percent of the County's impervious surface area consistent with the methodology described in the MDE document cited in PART IV.E.2.a. that has not already been restored to the MEP. Equivalent acres restored of impervious surfaces, through new retrofits or the retrofit of pre-2002 structural BMPs, shall be based upon the treatment of the WQ_v criteria and associated list of practices defined in the 2000 Maryland Stormwater Design Manual. For alternate BMPs, the basis for calculation of equivalent impervious acres restored is based upon the pollutant loads from forested cover.

- b. Within one year of permit issuance, Howard County shall submit to MDE for approval a restoration plan for each stormwater WLA approved by EPA prior to the effective date of the permit. The County shall submit restoration plans for subsequent TMDL WLAs within one year of EPA approval. Upon approval by MDE, these restoration plans will be enforceable under this permit. As part of the restoration plans, Howard County shall:*
 - I. Include the final date for meeting applicable WLAs and a detailed schedule for implementing all structural and nonstructural water quality improvement projects, enhanced stormwater management programs, and alternative stormwater control initiatives necessary for meeting applicable WLAs;*
 - II. Provide detailed cost estimates for individual projects, programs, controls, and plan implementation;*
 - III. Evaluate and track the implementation of restoration plans through monitoring or modeling to document the progress toward meeting established benchmarks, deadlines, and stormwater WLAs; and*
 - IV. Develop an ongoing, iterative process that continuously implements structural and nonstructural restoration projects, program enhancements, new and additional programs, and alternative BMPs where EPA approved TMDL stormwater WLAs are not being met according to the benchmarks and deadlines established as part of the County's watershed assessments.*

Annual Update Number 21 Status

To meet the requirements under section IV.E Restoration Plans and Total Maximum Daily Loads, Howard County developed several related projects in 2015 and 2016. First are the watershed assessments conducted in the Little Patuxent and Middle Patuxent watersheds, which were described in last year's annual report, and the assessments for the Patuxent and Patapsco watersheds which are described in the previous sections. Countywide Implementation Strategy, or CIS was developed in 2015 as the County's overall Restoration Plan. The County is currently in the process of revising the CIS based on MDE comments on the 2015 version, updates to the County's programs and strategies, and County progress made in FY16. Because the CIS is undergoing a major revision, Howard County is going to provide the revised CIS for public comment again in coordination with public comment period for the watershed assessments. The County has public meetings planned for late January 2017 to present the updated CIS and begin the 30-day public review and comment period. The revised CIS is expected to be complete in spring of 2017.

Howard County, Maryland

The CIS includes three major elements:

1. Impervious Area Assessment – to set the County’s total jurisdictional impervious area, the total treated impervious area, the baseline untreated impervious area, and the 20% restoration target.
2. Impervious Area Restoration – the CIS establishes the current progress and the planned project and programs needed to meet the impervious restoration by the end of the permit in December 2019.
3. TMDL Restoration – the CIS establishes the current progress and the planned project and programs needed to meet the County’s stormwater wasteload allocation (SW-WLAs) with cost, schedule, and final dates for meeting each required reduction.

The full draft CIS was submitted with Annual Update 20 for MDE review. The revised final CIS expected in spring 2017 will include more detailed methods and results on each of the following items, however summaries are given here to provide some detail.

Impervious Area Assessment

As a requirement of section PART IV.E.2.a of the County’s NPDES MS4 permit the County must conduct an impervious area assessment to define the restoration efforts required under the permit and restore 20% of remaining countywide baseline untreated impervious acres by 2019, the end of the current permit term. The CIS includes the County’s impervious accounting to determine the levels of treated, untreated and partially treated impervious surface under County MS4 jurisdiction and presents the County’s impervious surface baseline and 20% restoration goal.

The County’s impervious accounting was first detailed in the County’s Countywide Implementation Strategy submitted to MDE with AR20 in December of 2015. Updates to the accounting are based on MDE comments on the 2015 version and the MDE recommended change in the cutoff date between baseline and restoration to be coincident with the end of the County’s last permit, June 20, 2010. A full account of the methods and results is included as a narrative file submitted with the database. The results are summarized here.

The total County MS4 Impervious Area, or the area under Howard County jurisdiction, is 15,226.4 acres. The difference between this value and the total impervious area of 17,728.0 is impervious surfaces under other ownership (state lands) and portions regulated by other NPDES permits (MSHA and industrial sites). The impervious baseline treated area is 5,064.7 acres and the untreated area is 10,161.7 acres. Applying the 20% factor to the untreated area yields a 20% restoration target of 2,032.3 acres. A summary of the assessment per watershed is presented in Table 6.

Table 6: Impervious Area Assessment Summary in Acres

Watershed	Total Impervious Area	County MS4 Impervious Area	Impervious Baseline Treated	Impervious Baseline Untreated	Restoration Target (20%)
Triadelphia Reservoir (Brighton Dam)	1,511.9	1,378.5	288.3	1,090.2	218.0
Little Patuxent River	8,145.6	7,080.1	3,145.0	3,935.1	787.0
Middle Patuxent River	2,953.9	2,506.9	574.0	1,932.9	386.6

Patapsco River L N Br	3,611.2	2,971.4	747.8	2,223.7	444.7
Patuxent River Upper	372.6	311.0	79.0	232.0	46.4
Rocky Gorge Dam	471.0	426.2	86.0	340.2	68.0
South Branch Patapsco	661.8	552.2	144.6	407.6	81.5
Countywide	17,728.0	15,226.4	5,064.7	10,161.7	2,032.3

Impervious Area Restoration

A summary of the impervious restoration progress made by Howard County is included in Table 7 below. Additional details can be found in the attached impervious accounting narrative file. Projects and programs completed after June 20, 2010 are considered to be restoration and are applied to meeting the 20% target. The results indicate that the County has completed 1,027.7 impervious acres of restoration to apply to its 20% goal, leaving 984.7 acres of impervious restoration to be completed by the end of the permit term in December, 2019.

The revised CIS, once complete will offer a full accounting of current progress and the projects and programs recommended and planned would result in a total restoration of the required acreage.

Table 7: Impervious Area Restoration Progress Summary in Acres

Watershed	Restoration Target (20%)	Restoration Progress through FY16
Triadelphia Reservoir (Brighton Dam)	218.0	101.7
Little Patuxent River	787.0	508.3
Middle Patuxent River	386.6	235.6
Patapsco River L N Br	444.7	133.0
Patuxent River Upper	46.4	7.1
Rocky Gorge Dam	68.0	22.5
South Branch Patapsco	81.5	19.5
Countywide	2,032.3	1,027.7

TMDL Restoration Plan

Local TMDLs

As a requirement of section PART IV.E.2.b of the County's NPDES MS4 permit, the County must develop a restoration plan by December 2015 for each SW-WLA approved by EPA prior to the effective date of the permit. As noted previously the County developed the Countywide Implementation Strategy (CIS) in 2015 (submitted with AR20) to address this requirement. Because the CIS is undergoing a major revision, Howard County is going to provide the revised CIS for public comment again in coordination with public comment period for the watershed assessments. The County has public meetings planned for late January 2017 to present the updated CIS and begin the 30-day public review and comment period. The revised CIS is expected to be complete in spring of 2017.

There are currently eight final approved TMDLs within Howard County with either an individual or aggregate SW-WLA (Table 8). Although there are sediment and phosphorus TMDLs established for Centennial Lake (approved April 2002) and a bacteria TMDL established for the lower segment of the Patuxent River Upper (approved August 2011), they do not have SW-WLAs assigned to the Howard County MS4 source sector and are therefore not included in the CIS. The Triadelphia Reservoir has a

sediment TMDL; however, the County MS4 Phase I urban sector requires a 0% reduction in baseline sediment loads and will not be addressed further in the CIS. South Branch Patapsco does not have a local TMDL, but it is included in the analysis since it, with the Patapsco River Lower North Branch, makes up the Baltimore Harbor watershed. The Middle Patuxent watershed does not have a local TMDL. Attachment B of the County's current permit also lists a mercury impairment in Cash Lake in the Patuxent River Upper Watershed on the list of Howard County TMDLs with applicable SW-WLAs. Cash Lake and its drainage area are located wholly within Prince George's County, therefore Howard County is not responsible for this TMDL and it is not included in the CIS.

Table 8: Howard County Local TMDL Summary

Watershed Name	Watershed Number	WLA Type	Pollutant	Baseline Year	MDE Published Reduction
Patapsco River Lower North Branch	02130906	Individual	Sediment	2005	10.0%
		Aggregate	Bacteria	2005	13.4%
Baltimore Harbor (Patapsco R LN Br + S Br Patapsco)	02130906	Aggregate	Nitrogen	1995	15.0%
	02130908				
	02130906	Aggregate	Phosphorus	1995	15.0%
	02130908				
Patuxent River Upper	02131104	Individual	Sediment	2005	11.40%
Little Patuxent River	02131105	Individual	Sediment	2005	48.10%
Rocky Gorge Reservoir	02131107	Aggregate	Phosphorus	2000	15%
Triadelphia Reservoir (Brighton Dam)	02131108	Aggregate	Phosphorus	2000	15%
		Aggregate	Sediment	2000	0%

The CIS presents disaggregated and calibrated baseline loads for each SW-WLA to calculate the load reduction required from the baseline value. It is noted that the Patapsco River LNB bacteria TMDL is 13.4% reduction across the entire watershed, however at the subwatershed level there are three subwatersheds with 0% reduction, one subwatershed with 12.9% reduction, and most of the reduction is focused in one subwatershed requiring 54% reduction.

Based on MDE guidance, growth in the stormwater load since the TMDL baseline year was not accounted for in the analysis. Local TMDLs are considered met, from a planning perspective, when the load reductions associated with 2015 restoration progress coupled with the planned restoration load reductions included in the CIS exceed the load reduction required. Some TMDLs are estimated to be exceeded by a wide margin because removals per pollutant type are not achieved at the same rate. TN removal rates are relatively low compared to TP and TSS on a per project basis. This impacts watersheds with multiple TMDLs and also nested watersheds as in Baltimore Harbor.

Chesapeake Bay TMDL

The Chesapeake Bay TMDL, established by the EPA (EPA, 2010), sets pollution limits for nitrogen, phosphorus, and sediment in the Chesapeake Bay Watershed. While not a requirement in the County's NPDES MS4 permit, strategies provided in this plan to meet local TMDL reduction targets and impervious restoration treatment are also modeled against the Bay TMDL goals in order to calculate progress. The

County's MS4 permit is requiring compliance with the Chesapeake Bay TMDL for the stormwater sector through the use of the 20% impervious surface restoration strategy. Current

Management Measures

Management measures to reduce pollutant loads and restore impervious surfaces include structural stormwater (BMPs, alternate practices, and also non-structural County based and homeowner-implemented programs. The major project types accounted for in the CIS towards the reduction goals are presented in Table 9. These values are current as of the 2015 CIS and will be updated as the revisions to the CIS are completed in early spring 2017. These include projects currently identified in the County's Capital Improvement Plan (CIP) list, potential project sites identified with concept plans developed in the 2015 watershed assessments in the Little and Middle Patuxent, and potential project sites being finalized currently in the Patuxent and Patapsco assessment. They are listed here with the proposed level of implementation.

Table 9: CIS Planned Strategies

BMP	Number of Projects Planned Countywide	Accounting Unit	Countywide Total
Stormwater BMP Conversion	45	Drainage area acres	727.0
New Stormwater BMP	34	Drainage area acres	166.1
Outfall Stabilization	17	Linear feet	2,584.9
Outfall Enhancement (SPSC)	91	Linear feet	14,910.8
Stream Restoration	103	Linear feet	190,494.3
Urban Tree Planting	59	Acres planted	307.8
Rain Barrels	100 / year added	Per units implemented	300
Street Sweeping	NA	Miles swept	806.3
Septic System Pump-Outs	3,000 / year added	Per unit (annual practice)	9,000
Septic System Upgrades	30 / year added	Per unit	90

Note: rain barrel and septic totals are shown only for the three year period between FY16 and FY19 to coincide with the 2019 impervious restoration schedule end-date

Load Reductions

Load reductions to be achieved with implementation of the projects and programs detailed in the draft CIS are presented in Table 22 and will be updated with completion of the final CIS in spring 2017. With this level of implementation the local TMDLs in the Patuxent River Upper, Rocky Gorge Reservoir, and Brighton Dam (Triadelphia Reservoir), Baltimore Harbor, and Patapsco LNB will be met. Some TMDLs are projected to be far exceeded because removals per pollutant type are not achieved at the same rate. This occurs in watersheds with more than one pollutant type with a SW-WLA, and in nested watersheds. TN removal rates are relatively low compared to TP and TSS on a per project basis. For example, the number of projects needed to meet the Baltimore Harbor TN reduction goal resulted in overachieving on the TP reduction, and the TSS reduction in the Patapsco River LNB which is nested in the Baltimore Harbor watershed.

Table 10: SW-WLA Planned Reductions Summary

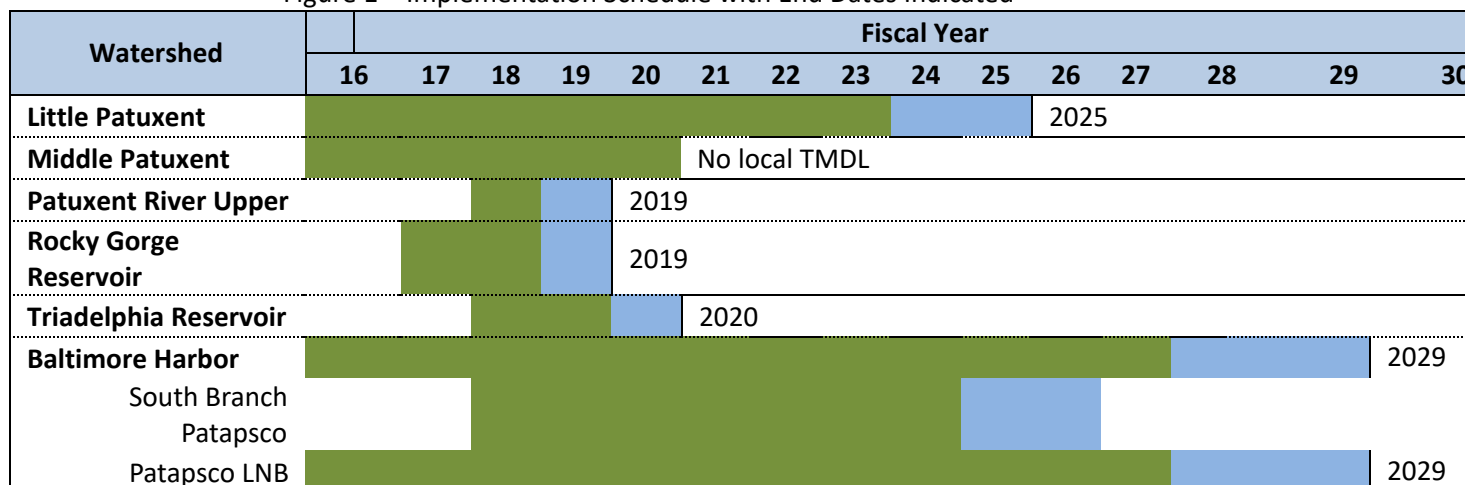
Watershed Name	Watershed Number	Pollutant	MDE Published Reduction Percent	Calibrated Target Reduction (EOS) ¹	CIS Planned Reduction Percent	Total Reduction (2015 Progress + Planned) ¹
Patapsco River Lower North Branch	02130906	Sediment	10.0%	612,344	48%	2,941,339
		Bacteria	13.4%	8,078	18.0%	10,837
Baltimore Harbor (Patapsco R LN Br + S Br Patapsco)	02130906	Nitrogen	15.0%	16,059	15.3%	16,344
	02130908					
	02130906	Phosphorus	15.0%	982	82.3%	5,389
	02130908					
Patuxent River Upper	02131104	Sediment	11.40%	16,633	34.1%	49,721
Little Patuxent River	02131105	Sediment	48.10%	4,976,821	48.5%	5,022,824
Rocky Gorge Reservoir	02131107	Phosphorus	15%	129	23.3%	201
Triadelphia Reservoir (Brighton Dam)	02131108	Phosphorus	15%	398	19.7%	522
		Sediment	0%	--	--	--

¹ EOS is Edge of Stream, all values in lbs/yr except for bacteria which is MPN/100 mL/yr

Cost and Schedule

As reported in the draft CIS from December 2015, the total projected cost to implement the County's CIP projects described in the plan is approximately \$222,290,000. Additional costs associated with the rain barrel and septic programs have been formulated and are estimated to add another \$915,000 to the total cost between FY17 and FY20. Implementation of the CIS at the required pace and with necessary funding is projected to meet the impervious surface restoration goal by December of 2019 and will meet the local TMDL-required reductions by the end dates indicated in the following figure, Figure 1.

Figure 1 – Implementation Schedule with End Dates Indicated



¹ Primary project completion period is shown in green, additional implementation contingent period for each TMDL are in blue.

² Baltimore Harbor TMDL includes the South Branch Patapsco and Patapsco Lower North Branch watersheds. There is no local TMDL specifically for the South Branch Patapsco.

Adaptive Management

The CIS is an important first step; however, the MS4 permit calls for an iterative and adaptive plan for implementation. The County will monitor implementation progress on a regular basis and will report progress, load reductions achieved, and impervious surface reductions to MDE with the NPDES Annual Update and at required milestone intervals. The County will review the CIS annually and make plan adaptations based on the results. If new methods of stormwater treatment are identified, or better approaches to source control are found, the plans can be extended and updated to take these changes into account. Similarly, if some elements of the plans are not as successful as expected, adaptations and improvements will be incorporated in future updates. Plans may also change if pollutant removal crediting methods are modified in the future.

3. Public Participation

Howard County shall provide continual outreach to the public regarding the development of its watershed assessments and restoration plans. Additionally, the County shall allow for public participation in the TMDL process, solicit input, and incorporate any relevant ideas and program improvements that can aid in achieving TMDLs and water quality standards. Howard County shall provide:

- a. Notice in a local newspaper and the County's website outlining how the public may obtain information on the development of watershed assessments and stormwater watershed restoration plans and opportunities for comment;***
- b. Procedures for providing copies of watershed assessments and stormwater watershed restoration plans to interested parties upon request;***
- c. A minimum 30 day comment period before finalizing watershed assessments and stormwater watershed restoration plans; and***
- d. A summary in each annual report of how the County addressed or will address any material comment received from the public.***

Annual Update Number 21 Status

Little Patuxent and Middle Patuxent Watershed Assessments

For the Little Patuxent and Middle Patuxent Watershed Assessments the County provided public notice in the Howard County Times legal section on June 4, 2015 and November 19, 2015 as well as on the County public meeting webpage and the SWMD webpage. A general press release noting the meetings was also available to local media outlets. The press release and legal ad noted when the watershed assessment and restoration plans would be available to begin the 30-day review period. Public meetings were held on the following:

Howard County, Maryland

Table 12: Little Patuxent River and Middle Patuxent River Watershed Assessment Public Meeting Schedule

Date	Watershed	Time	Location
6/17/2015	Southern Middle Patuxent	7:00 pm – 8:30 pm	Robinson Nature Center
6/22/2015	Northern Little Patuxent	7:00 pm – 8:30 pm	Dunloggin Middle School
6/24/2015	Southern Little Patuxent	7:00 pm – 8:30 pm	Hammond High School
6/30/2015	Northern Middle Patuxent	7:30 pm – 9:00 pm	Folly Quarter Middle School
Date	Watershed	Time	Location
12/2/2015	Northern Middle Patuxent	6:30 pm – 8:00 pm	Gary J. Arthur Community Center
12/3/2015	Southern Little Patuxent	6:30 pm – 8:00 pm	North Laurel Community Center
12/9/2015	Southern Middle Patuxent	6:30 pm – 8:00 pm	Robinson Nature Center
12/10/2015	Northern Little Patuxent	6:30 pm – 8:00 pm	Howard Community College

In addition to the public notice provided in the Howard County Times, postcards were mailed with meeting invitation encouraging the residents within the watershed(s) to attend the public meeting(s). All public meeting attendees were given the opportunity to comment on issues and goals of the watershed assessment.

The County investigated any issues brought to our attention and reviewed any comments received on the watershed assessments. During the public meetings only comments about specific problems on individual properties were received. We have followed up on all of them, either by meeting with the property owner and/or by adding the site to the watershed assessment.

After the public meetings, both the watershed assessments and the Countywide Implementation Strategy (CIS) reports were made available for public review and comment for a minimum 30 days. The County received comments on both documents from the Chesapeake Bay Foundation (CBF) and also received comments from a citizen regarding the CIS only. These were the only comments received. The MS4 Permit requires a summary of how the County addressed or will address material comments received from the public, which we are providing as follows:

1. Commenters noted that the summary tables indicate that the nitrogen reductions required by the Bay TMDL will not be met.

Response: The computations and tables provided in these documents are based on a portion of the projects identified in the LP/MP Study and projecting a similar number of sites for the yet to be completed Patapsco and Main Patuxent watershed study (currently underway). While nearly 800 potential projects were identified in the LP/MP Study it was only practical to prepare concept plans for 148 of those sites. The loading computations in the reports are based on the 148 sites with concept plans but there are obviously well more sites available for future projects, which can supply added nutrient

reductions. The CIS shows that the only local TMDL reduction target for nitrogen, which is in the South Branch Patapsco Watershed, will be exceeded. Also, MDE's Basis for Final Determination to Issue Howard County's NPDES MS4 Permit notes that the 20% restoration strategy will meet the necessary reductions for interim and long term Bay restoration milestones. The Permit itself states in Part VI Section A (Special Programmatic Conditions, Chesapeake Bay Restoration by 2025) that compliance with the Chesapeake Bay TMDL is required using the 20% restoration strategy within the five year permit term. No changes to either study have been made based on this comment.

2. CBF is concerned that stream restoration is the predominant type of project identified in the LP/MP Study. They contend that without doing upland infiltration and flow reduction stream projects often fail and they further state that stream projects are not cost effective.

Response: The County has been doing stream restoration projects for more than 10 years and our firsthand experience over that time shows stream projects to be very cost-effective. Except for one or two times where we've needed to do localized repairs, which were done by manual labor or with a small piece of equipment, the projects have been successful. The upland infiltration and flow reduction would most likely be spread out on multiple private properties, which are typically more problematic and less cost-effective both short and long term. The County can only recommend that private property owners put in rain gardens, dry wells, rain barrels, or other techniques for upland controls, but we cannot mandate their installation and we have no long term control over these voluntary BMPs. Furthermore these facilities will require inspections and routine maintenance, which adds costs to the County and time/costs to the private property owners. Anecdotally we are finding that many property owners with these types of ESD devices that are required by development regulations are filling them in and/or requesting that they be removed from their property. The County certainly promotes the use of voluntary BMPs on private properties such as rain gardens, swales, dry wells, rain barrels, and tree planting, but it is not prudent nor within our control to use these BMPs as a predominant means for achieving our restoration and TMDL goals. For example, as shown in the CIS, 586 rain barrels were given away by the County in four years, and these rain barrels account for only 0.3 acres of impervious area treatment. While rain barrels are good educational tools for teaching residents about water quality, they are clearly not the most cost-effective or efficient solution to meeting the short-term goals and requirements of the MS4 Permit. No changes to either study have been made based on this comment.

3. CBF notes that the restoration projects considered and recommended are unduly limited to publicly owned land.

Response: This statement is incorrect as close to 75% of the projects identified by the LP/MP Study are on private property. No changes to either study have been made based on this comment.

4. CBF recommends considering additional prioritization or performance factors when selecting projects for recommendation, such as permanence and maintenance costs.

Response: The County's prioritization approach in the LP/MP Study has already considered many factors including permanence and maintenance. While there might not have been specific line items with these two titles they have certainly been considered. We will try to make this more apparent in the current Patapsco/Main Patuxent watershed study. No changes to either study have been made based on this comment.

5. CBF suggests that timeframes for permit compliance and final wasteload allocation (WLA) targets appear to be inconsistent with the deadlines under the permit and Bay TMDL.

Response: The County has specifically used the aggressive MS4 permit and the Bay TMDL deadlines for providing a plan to meet both dates. Local TMDLs do not have a deadline yet, but the County feels that

we have suggested an equally aggressive schedule for meeting the local TMDLs, which are known at this time. No changes to either study have been made based on this comment.

6. CBF questions taking restoration and nutrient reduction credit for the stabilization of storm drain outfalls.

Response: The County intends on using restoration techniques in the MDE accounting documents to address the storm drain outfalls so taking restoration and nutrient reduction credit is proper. No changes to either study have been made based on this comment.

7. CBF states that citizen programs noted on pages 44-50 of the CIS are not accounted for in future load reduction projections.

Response: It is the County's intent to continue citizen programs that are found to be productive and help us to ultimately meet our goals and we will continue to look for new citizen programs. Examples of these programs include many current incentive programs to promote localized BMPs such as rain gardens, rain barrels, and tree planting. We are currently looking at a new incentive program relative to septic system maintenance. It should also be noted that the County performs many citizen related efforts, foremost of which is public education, which are not officially creditable through MDE's accounting documents; however we continue to pursue these efforts that help improve the quality of the waterways in the County, which ultimately helps the Bay. No changes to either study have been made based on this comment.

Mainstem Patuxent and Patuxent River Watershed Assessments

Watershed assessments for the Mainstem Patuxent River and Patapsco River Watersheds were performed in 2016. The Mainstem Patuxent River is made up of the Brighton Dam/Triadelphia Reservoir Watershed, the Rocky Gorge Reservoir Watershed, and the Upper Patuxent River Watershed. The Mainstem Patapsco River Watershed is made up of the Lower North Branch and the South Branch Patapsco River Watersheds. For the Mainstem Patuxent River and Patapsco River Watershed Assessments the County provided public notice for round 1 of the public meetings in the Howard County Times legal section on June 9, 2016 as well as on the County public meeting webpage and the SWMD webpage. A general press release noting the meetings was also available to local media outlets. The press release and legal ad noted when the watershed assessment and restoration plans would be available to begin the 30-day review period. Round 2 of the public meetings is scheduled for January 2017, and public notice will be posted according to the procedure followed for the round 1 meetings. Public meetings dates and times for the Mainstem Patuxent River and Patapsco River Watershed Assessments are following:

Table 13: Mainstem Patuxent River and Patapsco River Watershed Assessment Public Meeting Schedule

Date	Watershed	Time	Location
6/21/2016	Rocky Gorge Reservoir and Upper Patuxent River	7:00 pm – 8:30 pm	North Laurel Community Center
6/23/2016	Lower North Branch Patapsco	7:30 pm – 9:00 pm	Roger Carter Community Center

6/28/2016	South Branch Patapsco and Brighton Dam/Triadelphia Reservoir	7:00 pm – 8:30 pm	Gary J. Arthur Community Center
Date	Watershed	Time	Location
1/23/2017	Mainstem Patuxent River	7:00 pm – 8:30 pm	Gary J. Arthur Community Center
1/26/2017	Mainstem Patapsco River	7:00 pm – 8:30 pm	Roger Carter Community Center

Any comments received on the Mainstem Patuxent River and Patapsco River Watershed Assessments and information on how the comments were addressed will be included in the 2017 Annual Report.

4. TMDL Compliance

Howard County shall evaluate and document its progress toward meeting all applicable stormwater WLAs included in EPA approved TMDLs. An annual TMDL assessment report with tables shall be submitted to MDE. This assessment shall include complete descriptions of the analytical methodology used to evaluate the effectiveness of the County's restoration plans and how these plans are working toward achieving compliance with EPA approved TMDLs. Howard County shall further provide:

- a. Estimated net change in pollutant load reductions from all completed structural and nonstructural water quality improvement projects, enhanced stormwater management programs, and alternative stormwater control initiatives;*
- b. A comparison of the net change in pollutant load reductions detailed above with the established benchmarks, deadlines, and applicable stormwater WLAs;*
- c. Itemized costs for completed projects, programs, and initiatives to meet established pollutant reduction benchmarks and deadlines;*
- d. Cost estimates for completing all projects, programs, and alternatives necessary for meeting applicable stormwater WLAs; and*
- e. A description of a plan for implementing additional watershed restoration actions that can be enforced when benchmarks, deadlines, and applicable stormwater WLAs are not being met or when projected funding is inadequate.*

Annual Update Number 21 Status

Howard County developed its CIS in December 2015 to address restoration planning for its SW-WLA for the County's final approved TMDLs. As such, the reporting items requested under permit condition E.4.a-e are based on the 2015 progress evaluation presented in the CIS, and the planned management and restoration strategies. In subsequent years, the 'TMDL Compliance' section of the Annual Update will compare annual and cumulative implementation progress to the schedule in the CIS and will compare load reductions achieved to determine the rate of reduction. A detailed accounting of the stormwater BMPs, alternate practices and programs implemented through 2015 is

included in the County's CIS along with the analytical method used to calculate the reductions. The CIS is included with the County's Annual Update No. 20 submittal to MDE and sections are summarized here to address the permit condition. As is noted previously the CIS is currently being revised and an updated progress evaluation will be available in January of 2017.

Pollutant Load Reduction

Baseline, target, permit and current loads for nutrient, sediment, and bacteria local TMDLs are presented in the MDE_NPDES_MS4 geodatabase table LocalStormwaterWatershedAssessment. Countywide baseline, target, permit and current loads are presented in the MDE_NPDES_MS4 geodatabase table CountywideStormwaterWatershedAssessment.

Baseline and target loads including modeling approach and projects included in each of the models are described, in detail, in the CIS. All County completed structural and nonstructural water quality improvement projects, enhanced stormwater management programs, and alternative stormwater control initiatives through 12/18/2014 were modeled in MAST to calculate 2014 permit loads, while all treatment through 6/30/2016 were modeled to calculate 2016 current loads.

It is important to note, permit and current loads are only presented in the annual report and will not match what is presented in the County's CIS restoration plan. Permit and current loads are modeled on top of growth (i.e., 2014 land use conditions and 2016 land use conditions, respectively). Background land use loads in MAST increase as new development occurs throughout the years, which is why loads appear to increase between baseline, permit, and current conditions even with additional treatment from stormwater BMPs and other practices. Per guidance from MDE not to account for growth in local TMDL progress models, the County's Restoration Plan focuses on reductions and achieving the percent reduction without accounting for growth.

Item E.4.a requests the net change in pollutant loads reductions from all completed structural and nonstructural water quality improvement projects, enhanced stormwater management programs, and alternative stormwater control initiatives. Additionally, item E.4.b requires a comparison to the County's SW-WLAs. Taken together these requests are focused on the progress made in addressing local TMDL SW-WLAs. Therefore the County considers this request to include restoration projects and programs completed from the baseline SW-WLA year (which differs between watersheds) to the current year. Estimates up to 2015 are presented here and will be updated as the County's CIS is revised in early 2017.

Table 14: SW-WLA Progress Reductions as of 2015

Watershed Name	Watershed Number	Pollutant	Calibrated Target Reduction (EOS)¹	MDE Published Reduction Percent	2015 Progress Reduction (EOS)¹	2015 Progress Reduction Percent
Patapsco River Lower North Branch	02130906	Sediment	612,344	10.0%	99,887	1.6%
		Bacteria	8,078	13.4%	4,975	8.3%
Baltimore Harbor (Patapsco R LN Br + S Br Patapsco)	02130906	Nitrogen	16,059	15.0%	2,324	2.2%
	02130908					
	02130906	Phosphorus	982	15.0%	205	3.1%

	02130908					
Patuxent River Upper	02131104	Sediment	16,633	11.40%		
Little Patuxent River	02131105	Sediment	4,976,821	48.10%	697,379	6.7%
Rocky Gorge Reservoir	02131107	Phosphorus	129	15%	64	7.4%
Triadelphia Reservoir (Brighton Dam)	02131108	Phosphorus	398	15%	112	4.2%
		Sediment	--	0%		

¹ EOS is Edge of Stream, all values in lbs/yr except for bacteria which is MPN/100 mL/yr

Cost of Completed Projects

To date the County has encumbered approximately \$50 million for projects already constructed or are going to construction in FY16.

Cost of Planned Projects and Programs

The total projected cost to implement the County's CIP projects described in the CIS is approximately \$222,290,000. Estimates of the planned projects and associated cost per year are shown in Table 15. Additional costs associated with the rain barrel and septic programs have been formulated and will add another \$915,000 to the total cost between FY16 and FY19.

Table 15: Fiscal Year Schedule of Project Implementation Cost

Fiscal Year	Number of Planned Projects ¹	Total
2016	20	\$ 8,515,487
2017	38	\$ 27,555,179
2018	50	\$ 40,357,805
2019	48	\$ 38,026,169
2020	52	\$ 36,292,393
2021	21	\$ 11,293,285
2022	21	\$ 11,293,285
2023	21	\$ 11,293,285
2024	23	\$ 11,406,114
2025	21	\$ 9,320,252
2026	27	\$ 11,023,958
2027	8	\$ 5,912,839
Total	349	\$ 222,290,052

¹ Projects are distributed as percentages of totals per year, rounding causes total number to not match 349 when added independently

The relative costs per watershed per fiscal year are presented here in Table 16. The largest expenditures are expected in the Little Patuxent and Baltimore Harbor watersheds. The Little Patuxent is one of the most developed portions of the County and makes up a large portion (30%) of the County's untreated

impervious surface baseline, therefore 42% of overall project costs are expected for this watershed. Most of the Little Patuxent projects are scheduled for the 2016-2019 period to address the impervious restoration goal. The Baltimore Harbor watershed, which includes the Patapsco Lower North Branch and the South Branch Patapsco includes several SW-WLAs including Baltimore Harbor nutrients (nitrogen and phosphorus) and Patapsco River Lower North Branch sediment and bacteria. The nitrogen and bacteria SW-WLA are particularly costly to meet; therefore total estimate for the Baltimore Harbor is \$92,333,129, which represents 42% of the total CIP cost.

Table 16: Cost Estimate Summary Per Watershed

Watershed Name	Watershed Number	Cost Estimate
Baltimore Harbor (Patapsco R LN Br + S Br Patapsco)	02130906	\$ 79,701,233
	02130908	\$ 12,631,896
Patuxent River Upper	02131104	\$ 777,212
Little Patuxent River	02131105	\$ 92,504,931
Middle Patuxent River	02131106	\$30,207,095
Rocky Gorge Reservoir	02131107	\$ 1,804,424
Triadelphia Reservoir (Brighton Dam)	02131108	\$ 4,663,272

Adaptive Management

As stated in the CIS, Howard County is taking an adaptive management approach to the implementation of the recommended projects and associated load reductions. The County will monitor implementation progress on a regular basis and will report progress, load reductions achieved, and impervious surface reductions to MDE with the NPDES Annual Update and at required milestone intervals. The County will review progress annually to determine if the pace of implementation is yielding the anticipated reduction benefits. The CIS will be reviewed and updated as needed based on the results of the analysis. Likewise projections of cost will be compared against actual expenditures to determine if additional funding is required on per project basis, and if load reductions yields are less than expected additional projects and programs may be needed. Because the CIS is being formalized in late 2015, with some minor revisions necessary in early 2016, a more thorough evaluation of progress will be possible following the first year of implementation.

F. Assessment of Controls

Howard County and ten other municipalities in Maryland have been conducting discharge characterization monitoring since the early 1990s. From this expansive monitoring, a statewide database has been developed that includes hundreds of storms across numerous land uses. Analyses of this dataset and other research performed nationally effectively characterize stormwater runoff in Maryland for NPDES municipal stormwater purposes. To build on the existing information and to better track progress toward meeting TMDLs, better data are needed on ESD performance and BMP efficiencies and effectiveness.

Assessment of controls is critical for determining the effectiveness of the NPDES stormwater management program and progress toward improving water quality. The County shall use chemical, biological, and physical monitoring to assess watershed restoration efforts, document BMP effectiveness, or calibrate water quality models for showing progress toward meeting any

applicable WLAs developed under EPA approved TMDLs identified above. Additionally, the County shall conduct physical stream monitoring to assess the implementation of the latest version of the 2000 Maryland Stormwater Design Manual. Specific monitoring requirements are described below.

1. Watershed Restoration Assessment

The County shall continue monitoring in the Wilde Lake and Red Hill Branch watersheds, or select and submit for MDE's approval a new watershed restoration project for monitoring. Monitoring activities shall occur where the cumulative effects of watershed restoration activities can be assessed. One outfall and an associated in-stream station, or other locations based on a study design approved by MDE, shall be monitored. The minimum criteria for chemical, biological, and physical monitoring are as follows:

a. Chemical Monitoring

- i. Eight (8) storm events shall be monitored per year at each monitoring location with at least two occurring per quarter. Quarters shall be based on the calendar year. If extended dry weather periods occur, baseflow samples shall be taken at least once per month at the monitoring stations if flow is observed;*
- ii. Discrete samples of stormwater flow shall be collected at the monitoring stations using automated or manual sampling methods. Measurements of pH and water temperature shall be taken;*
- iii. At least three (3) samples determined to be representative of each storm event shall be submitted to a laboratory for analysis according to methods listed under 40 CFR Part 136 and event mean concentrations (EMC) shall be calculated for:*

<i>Biochemical Oxygen Demand (BOD₅)</i>	<i>Total Lead</i>
<i>Total Kjeldahl Nitrogen (TKN)</i>	<i>Total Copper</i>
<i>Nitrate plus Nitrite</i>	<i>Total Zinc</i>
<i>Total Suspended Solids</i>	<i>Total Phosphorus</i>
<i>Total Petroleum Hydrocarbons (TPH)</i>	<i>Hardness</i>
<i>E. coli or enterococcus</i>	

- iv. Continuous flow measurements shall be recorded at both in-stream monitoring stations or other practical locations based on an approved study design. Data collected shall be used to estimate annual and seasonal pollutant loads and reductions, and for the calibration of watershed assessment models. Pollutant load estimates shall be reported according to any EPA approved TMDLs with a stormwater WLAs.*

b. Biological Monitoring

- i. Benthic macroinvertebrate samples shall be gathered each Spring between the outfall and instream monitoring locations or other practical locations based on an approved study design; and*
- ii. The County shall use the EPA Rapid Bioassessment Protocols (RBP), Maryland Biological Stream Survey (MBSS), or other similar method approved by MDE.*

c. Physical Monitoring

- i. A geomorphologic stream assessment shall be conducted in the Red Hill Branch watershed monitoring location or in a reasonable area based on an approved study design. This assessment shall include an annual comparison of permanently monumented stream channel cross-sections and the stream profile;*
- ii. A stream habitat assessment shall be conducted using techniques defined by the EPA's RBP, MBSS, or other similar method approved by MDE; and*
- iii. A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-2, HEC-RAS, HSPF, SWMM, etc.) in the fourth year of the permit to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.*

d. Annual Data Submittal

The County shall describe in detail its monitoring activities for the previous year and include the following:

- i. EMCs submitted on MDE's long-term monitoring database as specified in PART V below;*
- ii. Chemical, biological, and physical monitoring results and a combined analysis for approved monitoring locations; and*
- iii. Any requests and accompanying justifications for proposed modifications to the monitoring program.*

Annual Update Number 21 Status**Watershed Restoration Assessment****Wilde Lake Monitoring**

In 2006, the County began monitoring in the Wilde Lake watershed, which has continued annually since its inception. The Wilde Lake monitoring program includes geomorphic, chemical, physical habitat, and biological assessments conducted throughout the watershed to determine if the restoration efforts outlined in the Centennial and Wilde Lake Watershed Restoration Plan (CWP, 2005) are succeeding in reducing pollutant loading and increasing the health of the lakes and streams. The goal of the monitoring strategy is to assess the overall condition rather than focusing on specific sites. Additional detail on monitoring in Wilde Lake and results can be found in Wilde Lake Watershed Discharge Characterization, Stream Monitoring and Watershed Assessment, Year Eleven – 2016 report included as a narrative file with the geodatabase submittal.

Stormflow data were collected at Wilde Lake on August 20 and September 10, 2015, January 10, April 7, April 28, May 21, June 5 and June 16, 2016. Baseflow data were collected on June 21, 2016. Average (2007-2016) concentrations of metals in stormflows (Cadmium, Lead, Copper and Zinc) at the Wilde Lake sampling site have been consistently below their associated acute criteria set by MDE. TSS levels in stormflow samples are elevated, but not excessive, as would be expected during storm events. E. coli counts were well above the published water quality criteria during 2015-2016 whereas previously fecal coliform counts have been consistently high during the years that storm samples have been collected.

Biological monitoring was conducted in Spring 2016 at five sites in the Wilde Lake watershed. This was the 11th consecutive year of monitoring at Wilde Lake, which began in the spring of 2006. Sites sampled in 2016 were repeat visits of sites sampled in 2006 and again in 2011. Results of the Year 11 biological and physical habitat assessments in Wilde Lake indicated that the streams varied in habitat quality, but

were only marginally capable of supporting aquatic life. Benthic macroinvertebrate sampling results were between 'Very Poor' and 'Poor' ratings where three sites were in the 'Very Poor' range, including the QC benthic macroinvertebrate site, and one site rated 'Poor'. Two of the five sampling sites had RBP habitat that rated 'Partially Supporting' and three rated 'Not Supporting'. MBSS's Physical Habitat Index (PHI) rated two sites 'Degraded' and two sites 'Severely Degraded' with the fifth site 'Partially Degraded'. Overall, the stream system in the Wilde Lake watershed exhibits evidence of the urban stressors affecting it and has not demonstrated marked improvement over the eleven years of monitoring.

Since 2006, a yearly geomorphic assessment has been conducted during the spring at sites throughout the Wilde Lake watershed. Assessment occurs at the same locations each year. The main goal of the monitoring is to assess the temporal variability of the geomorphic stability of the stream channels upstream of the lakes as they react to restoration activities. Overall, upstream improvements in the watershed do not appear to have significantly improved the habitat in the tributary streams. Based on 2006 – 2016 geomorphic assessments, the Wilde Lake mainstem continues to degrade with localized major changes in channel section and profile. Changes in bed features include bank erosion, bar formation, and high sediment supply. Sediment deposition and transport are common with significant mid-channel accumulations in some areas. Bed and bank erosion is most evident along the downstream profile. Upstream reaches are not experiencing the same level of erosion as the downstream reach. A riparian buffer is lacking along most of the channel.

Red Hill Branch Monitoring

In 2009, the County began monitoring in the Red Hill Branch watershed, which has continued annually since its inception. The Red Hill Branch monitoring program includes geomorphic, chemical, physical habitat, and biological assessments conducted within and downstream of restoration projects to determine if the restoration are succeeding in reducing pollutant loading and increasing the health of the stream system. What follows is a brief summary of monitoring activities and results for 2016. More detail and results can be found in the annual report, Red Hill Branch Restoration Monitoring Year 7–2016 included as a narrative file with the geodatabase submittal.

Stormflow data were collected at the permanent water quality monitoring station at the Red Hill Branch site at Meadowbrook Park on August 20, September 10, 2015, January 10, January 16, June 5, June 16, June 21, August 21, and September 30, 2016. The gap in monitored storm events from January to June of 2016 was due to beaver activity at the Meadowbrook Park site. Beaver had constructed a dam directly over the intake for the storm sampling equipment and required the services of a professional nuisance wildlife company to remove the animals before sampling could resume. Event mean concentrations of storm runoff total nitrogen, TSS, and total phosphorus ranged from 1.00 – 2.57 mg/mL for total nitrogen, 7 – 2,127 mg/mL for TSS, and 0.06 – 0.18 mg/mL for total phosphorus. Average metal concentrations at Meadowbrook Park were below their respective acute MDE criteria. E. coli levels for all samples were well above the published water quality criteria.

A total of eight storm events were sampled at the Red Hill Branch – Bramhope Lane retrofit site during 2015-2016. Storms were sampled on August 20, and December 17, 2015, February 23, March 2, April 7, May 17, June 16, and August 21, 2016. For the upstream site event mean concentrations ranged from 1.09 – 3.02 mg/mL for total nitrogen, 2 – 50 mg/mL for TSS, and 0.10 – 0.24 mg/mL for total phosphorus. At the downstream Bramhope site event mean concentrations ranged from 0.94 – 2.24 mg/mL for total nitrogen, 2 – 169 mg/mL for TSS, and 0.07 – 0.30 mg/mL for total phosphorus.

Eight storm events were also sampled at the Salterforth pond retrofit site during 2015-2016. Storms were sampled on August 20, September 10, and December 17, 2015, April 7, May 17, June 16, August 21, and September 28, 2016. For the inflow site event mean concentrations ranged from 0.61 – 2.88 mg/mL for total nitrogen, 5 – 80 mg/mL for TSS, and 0.15 – 0.44 mg/mL for total phosphorus. At the outfall site event mean concentrations ranged from 0.60 – 5.64 mg/mL for total nitrogen, 1 – 26 mg/mL for TSS, and 0.13 – 0.41 mg/mL for total phosphorus.

A biological monitoring program was initiated in Red Hill Branch during the spring of 2010 and has continued annually. The program includes the collection and analysis of the macroinvertebrate community, physical habitat assessments, and measurements of in situ water chemistry. Biological assessments involve macroinvertebrate sampling at three sites located at the downstream end of the major drainage areas within the Red Hill Branch subwatershed as well as a fourth control site located in an adjacent watershed. The monitoring stations are being used for the assessment of restoration activities in this watershed. In Red Hill Branch, post-restoration monitoring results indicate a subwatershed in an overall degraded ecological condition, with little change from the first two years of pre-restoration monitoring. During 2016, all sites were classified as 'Poor' for biological condition, with an overall BIBI score of from 2.67 to 2.00. Habitat during 2016 assessment at all sites rated 'Degraded' and 'Severely Degraded' and was classified as 'Non Supporting' and 'Partially Supporting' of aquatic life. The biological community and habitat remain in a degraded condition and have not shown any significant improvement after restoration.

Geomorphic assessments in the Red Hill Branch subwatershed were conducted in the spring of 2016, five years after the completion of the Bramhope Lane stream restoration project, to evaluate the effectiveness of this and other restoration projects undertaken in this subwatershed. Assessments were conducted at three sites, one within the lower portion of the restoration site, one downstream of the restoration site, and one on a similar channel in an adjacent watershed intended to serve as a control. Assessment included longitudinal profiles, permanently monumented cross-section surveys, pebble counts, substrate facies mapping, bulk-bar sample sieve analysis, and measurement of bed/bank pins and scour chains. Geomorphic assessments indicate some changing conditions and differences in stability of the three monitoring reaches in the fifth year of post-restoration monitoring. In the years prior to restoration at all three reaches, bed features exhibited evidence of the continually shifting, dynamic nature of these systems, including deposition in some pools and bars, deepening of other pools, and shifting locations of riffle crests. These conditions persisted at the non-restored reaches over the five years of post-restoration monitoring. In contrast, there has been far less change in channel dimensions and profiles, and notably less erosion and deposition during post-restoration monitoring at the restoration reach. On the other hand, cross-sections at the downstream reach and the control reach continue to see significant changes.

Dorsey Hall Monitoring

The County began monitoring sites in the Dorsey Hall project area in 2014 to assess new restoration activities in the Red Hill Branch watershed located downstream of the sites at Meadowbrook Park, Bramhope Lane stream restoration, and the Salterforth pond retrofit. Two sites were added, one on Red Hill Branch at Columbia Rd downstream of all restoration activities, and one site near the downstream end of Plumtree Branch upstream of its confluence with Red Hill Branch to measure effects of stormwater coming from the untreated Plumtree Branch. At each site chemical, biological, and physical habitat monitoring have been conducted annually.

Chemical monitoring consists of baseflow and stormflow chemical sampling for nitrogen, phosphorus, and sediment. Eight storm events were also sampled at the Salterforth pond retrofit site during 2015-2016. Storms were sampled on August 12, and December 17 (Columbia Rd only), 2015, January 10 (Plumtree only), February 23, March 14, April 4, May 1, and July 28, 2016. For the Columbia Rd site event mean concentrations ranged from 0.84 – 1.56 mg/mL for total nitrogen, 4 – 156 mg/mL for TSS, and 0.10 – 0.24 mg/mL for total phosphorus. At the Plumtree site event mean concentrations ranged from 1.38 – 5.52 mg/mL for total nitrogen, 8 – 180 mg/mL for TSS, and 0.16 – 1.64 mg/mL for total phosphorus.

Biological and physical habitat monitoring was conducted at these sites during summer of 2016. Both sites rated 'Poor' for biological condition, with the Columbia Rd scoring a 2.00 and Plumtree scoring 2.33. Maryland's PHI results for the Dorsey Hall sites show both sites falling the lowest 'Severely Degraded' category with scores of 50.3 for Columbia Rd and 27.4 for Plumtree. The RBP habitat results were similar with both sites in the 'Not Supporting' category with scores of 52% and 51% of reference. The physical habitat results show that both sites are severely impacted, most likely from urban development.

Turf Valley Monitoring

To evaluate potential improvements in water quality that may occur as a result of planned restoration projects in the Turf Valley project area, Howard County began conducting pre-restoration monitoring in 2014 with plans to continue monitoring annually. The Turf Valley projects are located on the headwaters of the Little Patuxent River between Turf Valley Road and Bethany Lane. The County is conducting biological monitoring at three sites, one each at the downstream end of two tributaries to the Little Patuxent River and also on the mainstem just below all of the planned restoration. This reporting period includes the first round of pre-restoration monitoring conducted in 2014, a combination of pre- and post-restoration monitoring in 2015, and post-restoration monitoring starting in 2016.

Like Dorsey Hall, biological and physical habitat monitoring was conducted at these during summer of 2016. Results of the biological monitoring show that the two tributary sites are in poor condition, each falling in the 'Poor' category from 2014 – 2016 with scores varying between 2.00 and 2.33 each year. The mainstem Little Patuxent site is in better condition, scoring a 3.00 each year and falling in the 'Fair' category. The RBP physical habitat scores have varied year-to-year at the two tributary sites, decreasing in 2015 from the initial assessments in 2014, but returning to similar scores and ratings in 2016. The RBP scores at the mainstem Little Patuxent have remained stable over the three years of data. Maryland PHI scores and ratings at the two tributary sites scored the highest in 2016, with the pond retrofit site going from 'Severely Degraded' to 'Degraded' and the stream restoration site going from 'Degraded' to 'Partially Degraded'. The PHI scores at the Little Patuxent site, similar to the RBP scores, have remained constant across the three years of data. Biological scores have not changed after construction of the restoration and retrofit projects in the Turf Valley area.

Annual Data Submittal

Monitoring reports associated with Assessment of Controls monitoring including the programs summarized above, and the Rumsey Run Stormwater Management Assessment described below, can be found in the narrative files associated with the NPDES Geodatabase submittal. Also included are the monitoring site locations and drainage areas in the MonitoringSite and MonitoringDrainageArea feature classes.

The required chemical monitoring results and EMCs are found in the County's geodatabase submittal in the ChemicalMonitoring table for Wilde Lake and Meadowbrook (Red Hill). All metals data in the table have been converted to micrograms per liter. The County chose this year to also report on other monitoring that is being conducted above the NPDES requirements at several sites. These sites are partially funded by Chesapeake and Atlantic Coastal Bays funding and are focused on assessing watershed restoration, therefore the County chose to include them. Because they are not NPDES compliance specific sites, they do not have all data as required by the NPDES permit. These sites are associated with the Dorsey Hall project (Plumtree - PT and Columbia Road - CR) and the Red Hill monitoring at Brampton Hills (aka Bramhope Lane, Upstream - BH01, Downstream, BH02). For these sites only FY16 data are included currently but the County does plan to add all of the data for these sites to the database.

The required biological monitoring data are included in the BiologicalMonitoring table for the Wilde Lake and Red Hill monitoring projects. As with the chemical data, there are additional biological data submitted for the Dorsey Hall and Turf Valley monitoring projects.

At this time, the County has no requests for modification to its monitoring program.

2. Stormwater Management Assessment

The County shall continue monitoring the Rumsey Run (tributary to Red Hill Branch) watershed, or select and submit for MDE's approval an alternative project for determining the effectiveness of stormwater management practices for stream channel protection. Physical stream monitoring protocols shall include:

- a. An annual stream profile and survey of permanently monumented cross-sections in Rumsey Run to evaluate channel stability in conjunction with surrounding and on-going commercial development;***
- b. A comparison of the annual stream profile and survey of the permanently monumented cross-sections with baseline conditions for assessing areas of aggradation and degradation; and***
- c. A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-2, HEC-RAS, HSPF, SWMM, etc.) in the fourth year of the permit to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.***

Annual Update Number 21 Status

Rumsey Run Monitoring

In 2011, to evaluate the effectiveness of recent stormwater controls from developed sites for stream channel protection, Howard County and MDE chose an unnamed tributary to Red Hill Branch (hereafter called Rumsey Run) within the Red Hill Branch subwatershed for analysis. The County is monitoring the effectiveness of the 2000 Maryland Stormwater Design Manual and other innovative stormwater management technologies through geomorphic assessments, limited runoff investigations, and modeling in Rumsey Run. A full report of Rumsey Run monitoring methods, data analysis, and results are provided in the Evaluation of Maryland Stormwater Management Methods in Rumsey Run Year 5 – 2016 report,

Howard County, Maryland

produced as a stand-alone document and submitted as part of the Annual Update as a narrative file.

Overall results suggest that the stormwater management practices in the drainage areas of the middle and lower reaches are having a positive effect on the maintaining the stability of the stream. The middle reach receives drainage from the newest development which was constructed with ESD practices for stormwater management and with MDE 2000 channel protection criteria. This reach was overall very stable and contained the cross sections with the least amount of measured change in terms of cross-sectional area and downcutting. The upstream end of the middle reach also has a large portion of intact riparian buffer on the left bank, which also likely contributes to the overall stability of the reach. Additionally, since the development in this middle reach is the most recent, the stream has had the least amount of time to show the potential effects of the development, when compared to the other reaches, which have much older development within their drainage areas. Therefore it is possible that over time this area may show similar signs of degradation. The lower reach receives drainage from an older development with pre-2000 stormwater management. The longitudinal profile in this reach was also quite stable, however the banks have experienced some widening over time. Finally, the upper reach receives drainage from an industrial park with little to no stormwater management and high levels of impervious surfaces. This reach is by far the least stable, with three major headcuts, and cross sections that show significant widening and downcutting. This reach also has the highest overall slope, at 2.3%. It is likely that the lack of stormwater controls, coupled with higher valley and channel slopes in this section have resulted in the observed degradation. Higher slopes will drive higher velocities and shear stress for the same level of discharge as compared with a lower slope segment, like those present in the middle and lower reaches. The lower slopes in those segments are likely buffering the channel from channel bed and bank erosion.

As per the County's new permit, hydrologic and/or hydraulic modeling will be conducted during the fourth year of the current permit and therefore there are no updates to include at this time.

G. Program Funding

1. ***Annually, a fiscal analysis of the capital, operation, and maintenance expenditures necessary to comply with all conditions of this permit shall be submitted as required in PART V. below.***
2. ***Adequate program funding to comply with all conditions of this permit maintained. Lack of funding does not constitute a justification for noncompliance with the terms of this permit.***

Annual Update Number 21 Status

Howard County appropriated more than \$90 million to implement various aspects of NPDES activities and associated work during permit years FY06 through the first half of FY16 (the first half of FY16 is used since the County's new permit was issued halfway through FY16). The County continues to appropriate significant funding for its current permit, which was issued midway through FY16. The fiscal database has been completed to report on the funding for the current permit term.

The database breaks out the funding into capital costs, operational costs, and information on the Watershed Protection and Restoration Fund (WPRF), as well as allowing the County to provide optional breakdowns for more specific task funding including maintenance. Capital costs include but are not limited to stream restoration and SWM construction projects, site-specific post-construction monitoring,

and the purchase of monitoring equipment. Operational costs include but are not limited to County staff salaries, supplies, annually repeated expenses such as biological, physical, and chemical monitoring at NPDES program sites, illicit discharge inspections, SWM facility inspections, and public outreach efforts.

The County continues to pursue grant funds to supplement its capital and operational funds. In FY17 the County was selected to receive a \$2 million Chesapeake and Atlantic Coastal Bays Trust Fund grant. These grant funds help the County leverage its available capital funds to be able to complete even more NPDES related water quality projects.

The County intends to maintain an adequate level of funding throughout the current permit term. As noted in previous Annual Updates, all funding shown herein and proposed is subject to yearly approval by the County Council and the County Executive.

Watershed Protection and Restoration Fund (WPRF)

In March of 2013, the County adopted legislation to enact the WPRF to be charged based on the number of 500 square-foot impervious units for all properties. In July of 2013 the legislation was amended to modify the manner in which residential properties were charged based on the size of the parcel. Three tiers were established, and the rates for townhomes, properties less than ¼ acre and properties greater than ¼ acre are charged \$15, \$45, and \$90 per year, respectfully. In addition, programs were established to provide reduced fees for agriculturally assessed properties and non-profit properties if they met certain criteria identified that reduced the potential for impact. Further, residential and commercial project reimbursement and fee credit programs were established for property owners that chose to add additional stormwater BMPs to their parcel.

The WPRF funds are budgeted among various County agencies to fund programs such as:

- BMP controls to manage stormwater flow and reduce pollutants
- Storm drain infrastructure, operation, repairs and upgrades
- MS4 permit compliance including monitoring and enforcement
- Stormwater education, outreach, and incentive programs

The distribution of funds is presented in a pie chart on www.cleanwaterhoward.com in compliance with the state legislation.

Section III. Program Review and Annual Progress Reporting

A. Annual Reporting

As required by the NPDES permit, the County is submitting all Annual Update Databases on the attached DVD in geodatabase file. In addition to the required databases, the following narrative files are included:

Table 17: Narrative Files

	Narrative Files	
ARL SWPPP Quarterly Inspection 04-08-2016.pdf	Utilities SWPPP - Rev 7.pdf	Utilities SWPPP Vis Mon 2016 Q2.pdf
CMTO SWPPP Insp 2016-03-14.pdf	ARL Annual Report - 2016.pdf	Stream Rest Verification Insp Protocol Memo.pdf
Cooksville SWPPP Insp 2016-02-03.pdf	CMTOF Annual Report - 2016.pdf	bmp field inspection form.docx
Dayton SWPPP Insp 2016-03-29.pdf	Cooksville Annual Report - 2016.pdf	bmp inspection sop.docx
LPWRP SWPPP Insp 2016-02-24.pdf	Dayton Annual Report - 2016.pdf	GIS FCE Inspections Protocol Memo.docx
Mayfield SWPPP Insp 2016-03-15.pdf	LPWRP Annual Report - 2016.pdf	Inspecting Forest Consvr Easements - 430.7.pdf
Rec & Pks HQ SWPPP Insp 2016-02-03.pdf	Mayfield Annual Report - 2016.pdf	Refrstn Tree Plntng on Public & Private Lands.pdf
Ridge Rd SWPPP Insp 2016-01-04.pdf	Rec & Pk HQ Annual Report - 2016.pdf	Pesticide Use on County Parkland.docx
Utilities SWPPP Insp 2016-03-23.pdf	Utilities Annual Report - 2016.pdf	Rumsey Run 2016 Report 20161215.pdf
ARL SWPPP - Rev 5.pdf	Howard Co Imp Acctg Methodology 12.19.16.pdf	Street Sweeping List of Transactions FY16.pdf
CMTOF SWPPP.pdf	ARL SWPPP Vis Mon 2016 Q2.pdf	Brampton Hills Load Red 2015 Anl Rpt 20161118.pdf
Cooksville SWPPP - Rev 3.pdf	CMTO SWPPP Vis Mon 2016 Q2.pdf	Red Hill Branch 2016 Report 20161216.pdf
Dayton SWPPP - Rev 3.pdf	Cooksville SWPPP Vis Mon 2016 Q2.pdf	TurfValley 2916 Report 20161215.pdf
LPWRP SWPPP - Rev 8.pdf	Dayton SWPPP Vis Mon 2016 Q2.pdf	Wilde Lake 2016 Report 20161216.pdf
Mayfield SWPPP - Rev 5.pdf	LPWRP SWPPP Vis Mon 2016 Q2.pdf	D TableM NPDES Contacts 2016.xlsx
Rec & Pks HQ SWPPP - Rev 5.pdf	Mayfield SWPPP Vis Mon 2016 Q2.pdf	Howard County - Rooftop Disconn Analysis.pdf
Ridge Rd SWPPP - Rev 5.pdf	Rec & Pks HQ SWPPP Vis Mon 2016 Q2.pdf	Howard County - NonRooftop Disconn Analysis.pdf

Section IV. Special Programmatic Conditions

A. Chesapeake Bay Restoration by 2025

A Chesapeake Bay TMDL has been developed by the EPA for the six Bay States (Delaware, Maryland, New York, Pennsylvania, Virginia, and West Virginia) and the District of Columbia.

The TMDL describes the level of effort that will be necessary for meeting water quality criteria and restoring Chesapeake Bay. This permit is requiring compliance with the Chesapeake Bay TMDL through the use of a strategy that calls for the restoration of twenty percent of previously developed impervious land with little or no controls within this five year permit term as described in Maryland's Watershed Implementation Plan. The TMDL is an aggregate of nonpoint sources or the load allocation (LA), and point sources or WLA, and a margin of safety. The State is required to issue NPDES permits to point source discharges that are consistent with the assumptions of any applicable TMDL, including those approved subsequent to permit issuance.

Urban stormwater is defined in the CWA as a point source discharge and will subsequently be a part of Maryland's WLA. The NPDES stormwater permits can play a significant role in regulating pollutants from Maryland's urban sector and in the development of Chesapeake Bay Watershed Implementation Plans. Therefore, Maryland's NPDES stormwater permits issued to Howard County and other municipalities will require coordination with MDE's Watershed Implementation Plan and be used as the regulatory backbone for controlling urban pollutants toward meeting the Chesapeake Bay TMDL by 2025.

B. Comprehensive Planning

Howard County shall cooperate with other agencies during the completion of the Water Resources Element (WRE) as required by the Maryland Economic Growth, Resources Protection and Planning Act of 1992 (Article 66B, Annotated Code of Maryland). Such cooperation shall entail all reasonable actions authorized by law and shall not be restricted by the responsibilities attributed to other entities by separate State statute, including but not limited to reviewing and approving plans and appropriating funds.

Annual Update Number 21 Status

The County recognizes the importance of the Tributary Strategy objectives and has been working with MDE and other municipalities to help achieve the goals of the new 2014 Bay Agreement. The following paragraphs describe Howard County's recent and ongoing participation in programs that address the Chesapeake Bay water quality goals.

Patuxent Reservoirs Technical Advisory Committee

In 1996, Howard County joined Montgomery County, Prince George's County, WSSC, Maryland National Capital Park and Planning Commission (MNCPPC), HSCD, and Montgomery Soil Conservation District (MSCD) in signing the Patuxent Reservoirs Watershed Protection Agreement. The Agreement recognized the importance of protecting the long-term biological, physical and chemical integrity of the watershed. The Agreement established a Policy Board and a Technical Advisory Committee (TAC) to oversee implementation of a protection strategy for the watershed.

TAC member activities have included water quality monitoring and modeling, implementing agricultural best management practices, stormwater retrofits and stream channel restoration, and public outreach and education. The TAC has developed a list of priority resources in the watershed: the reservoirs and drinking water supply; terrestrial habitat; stream systems; aquatic biota; rural character and landscape; and public awareness and stewardship. TAC member agencies continued progress in the following areas: evaluating progress toward TMDL implementation for the Patuxent reservoirs, agricultural BMP implementation, reservoir monitoring, and public outreach. The TAC also revised the Patuxent Reservoirs Protection Strategy Memorandum of Understanding, which established an Agricultural BMP Cost Share Program, to make more properties eligible for the program and increase the types of BMPs the program would fund. WSSC and Howard County renewed program funding for HSCD; MSCD still has funds remaining. The TAC produces an Annual Update that documents the TAC's accomplishments for the past year and priorities for the upcoming year.

Howard County's major initiatives in the Patuxent Reservoirs watershed include the now completed Cherry Creek watershed restoration projects, as well as ongoing biomonitoring and public outreach activities. The first round of biomonitoring was conducted in the reservoirs watershed in 2001 and 2003, and a second round of monitoring was done in the Cattail Creek and Brighton Dam watersheds in 2005 and in the Rocky Gorge watershed in 2009. The third round of biomonitoring was conducted in 2012 and performed at the Upper and Lower Brighton Dam and Cattail Creek watersheds.

Patuxent River Commission

Howard County is a member of the Patuxent River Commission. The Commission provides oversight for implementation of the Patuxent River Policy Plan and development of the Chesapeake Bay Watershed Implementation Plan (WIP). The Policy Plan is a land management strategy to reduce nonpoint source pollution, and protect and restore habitat in the Patuxent River watershed. The WIP specifies actions to achieve pollutant load reductions from wastewater treatment plants, septic systems, agriculture and urban stormwater, to meet the Chesapeake Bay Total Maximum Daily Loads for nitrogen, phosphorus and sediment. . In 2013, the Commission began developing an update to the Policy Plan to reflect the new Bay TMDLs, and is moving forward with local and State adoption of the updated Policy Plan in 2014. For more information about the Patuxent River Commission, please see the Maryland Department of Planning web page at

<http://www.mdp.state.md.us/OurWork/PatuxentRiverCommInfo.shtml> .

Lower Patapsco Watershed Restoration Action Strategy

The Lower Patapsco Watershed Restoration Action Strategy (WRAS) was issued in 2006. The WRAS is a watershed restoration plan and implementation strategy that serves as a work plan for restoring and protecting water quality and aquatic and terrestrial habitats, and for addressing community needs for environmental outreach and education in the Lower North Branch Patapsco River watershed. The WRAS included a more detailed assessment of restoration opportunities in the Rockburn Branch and Sucker Branch subwatersheds. Recommended projects in the WRAS include stormwater retrofits, stream and buffer restorations, and public outreach and education. The County has added priority restoration projects identified through the WRAS to the County capital budget for implementation.

Patapsco/Back River Tributary Team

Howard County is a member of the Patapsco/Back River Tributary Team. The Team no longer receives official staff support from DNR, however, a team member remains active and helps organize communications and meetings voluntarily. The Team focuses on serving as a forum for information exchange and brings together jurisdictions and groups within the watershed as needed. The Team works

to inform and increase stakeholder participation in the Chesapeake Bay TMDL and the Watershed Implementation Plan (WIP) process.

Water Resources Element

The Howard County Water Resources Element (WRE), adopted in April 2010, is an amendment to PlanHoward 2030 that adds Policies and Actions intended to ensure that the County has adequate water resource capacities to meet future growth needs through 2030. In particular, the WRE seeks to ensure a safe and adequate supply of drinking water, and adequate land and water capacity for the treatment of wastewater and stormwater. The WRE reflects the opportunities and limitations presented by local and regional water resources. It is intended to improve protection of land and water resources and to address water resource goals within the context of local and State smart growth policies. For more information on the WRE, please see the County web page at

<https://www.howardcountymd.gov/Departments/Public-Works/Bureau-Of-Utilities/Tech-Support-Division/Bureau-of-Utilities-Water-Resources-Element>.

Cooperative Project with the U.S. Geological Survey

Howard County continues cost-sharing for the cost to operate a U.S. Geological Survey (USGS) flow gauging station on the Little Patuxent River near Savage, MD.

Maryland Water Monitoring Council

The County continues to participate in the MWMC's annual conferences, which are held at the Maritime Institute in Linthicum, MD. This year's conference was held on December 2, 2016 and the theme of the conference was "A River Runs Through It – Strengthening Networks and Connections".

References

Barbour, M.T., J. Gerritsen, B.D. Snyder, and J.B. Stribling. 1999. Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish, Second Edition. EPA 841-B-99-002. U.S. Environmental Protection Agency, Office of Water, Washington DC.

Federal Highway Administration Agency, 2003. Stormwater Best Management Practices in an Ultra-Urban Setting. Accessed in May 2003 at <http://www.fhwa.dot.gov/environment/ultraurb/index.htm>

Howard County. Draft - Howard County Fiscal 2013 Capital Budget. Ellicott City, Maryland. 2012.

Howard County DPW/SWMD. 2005. Centennial and Wilde Lake Watershed Restoration Plan. Prepared by the Center for Watershed Protection and Tetra Tech, Inc. for Howard County, MD. September.

Howard County DPW/SWMD. 2009. Upper Little Patuxent River Watershed Management Plan. Prepared by KCI Technologies, Inc. for Howard County, MD. September.

Howard County. 2013. Evaluation of Maryland Stormwater Management Methods in Rumsey Run – Year 2 (2012 to 2013). Prepared by Versar, Inc. for Howard County, MD. June.

Howard County. National Pollutant Elimination System Permit Application for Operators of Municipal Separate Storm Sewer Systems. Part 1. Ellicott City, Maryland. July 1993.

Howard County. National Pollutant Elimination System Permit Application for Operators of Municipal Separate Storm Sewer Systems. Part 2. Ellicott City, Maryland. April 1995.

Howard County. *NPDES Permit No. MS-HO-95-008 Annual Update Number 1-5*. Ellicott City, Maryland. April 1996 – April 2000, respectively.

Howard County. *NPDES Permit No. 00-DP-3318 Annual Update Number 6-10*. Columbia, Maryland. June 2001 – June 2005, respectively.

Howard County. *NPDES Permit No. 00-DP-3318 Annual Update Number 11-18*. Columbia, Maryland. June 2006 – June 2013, respectively.

Howard County. 2013. Red Hill Branch Watershed Restoration – Year 3 (2012) – Post Restoration Conditions Monitoring. Prepared by Versar, Inc. for Howard County, MD. June.

Howard County. 2013. Wilde Lake Watershed Discharge Characterization, Stream Monitoring, and Watershed Assessment – Year Eight (2013). Prepared by Versar, Inc. for Howard County, MD. June.

Kellerhals, R. 1967. "Stable Channels with Gravel-Paved Beds," *Journal of Waterways and Harbors Division*, American Society of Civil Engineers, pp 63-84.

Maryland Department of the Environment. 2000 Maryland Stormwater Design Manual. Revised May 2009.

Maryland Department of the Environment. National Pollutant Elimination System Permit Application Guidance for Operators of Municipal Separate Storm Sewer Systems. Part 2. Final. Baltimore. July 1992.

Maryland Department of Planning Website: <http://www.mdp.state.md.us>

Northern Virginia Planning District Commission, 1979. Guidebook for Screening Urban Nonpoint Pollution Management Strategies. Prepared for the Metropolitan Washington Council of Governments

Parker G. 1979. Hydraulic geometry of active gravel rivers, *Journal of Hydraulic Engineering*, 105, 1185-1201.

Paul, M.J., J.B. Stribling, R.J. Klauda, P.F. Kazyak, M.T. Southerland, and N.E. Roth. 2002. A Physical Habitat Index for Freshwater Wadeable Streams in Maryland. Maryland Department of Natural Resources, Monitoring and Non-Tidal Assessment Division. Annapolis, MD. CBWP-MANTA-EA-03-4.

Schueler, T.R. 1987. Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban BMPs. Metropolitan Washington Council of Governments. Publication number 87703. p. A-4.

Waters, T. F. 1995. *Sediment in Streams: Sources, Biological Effects and Controls*. American Fisheries Society Monograph 7. American Fisheries Society, Bethesda, MD.

Attachment - Database DVD